



Sydney2030/Green/Global/Connected



Sustainable Design Technical Guidelines

city of villages



Cover image: Waranara Early Education Centre

Above: Artist's impression of Green Square Library and Plaza | Image courtesy of Stewart Hollenstein with Colin Stewart Architects

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01 Introduction

1.1 Background

The City of Sydney (the City) has a diverse portfolio of assets in development and currently operating throughout Sydney Local Government Area (LGA). From local swimming pools to multi-storey commercial buildings, the City has continued to push Sydney's development as a thriving modern metropolis where its residents can live, work and play harmoniously.

Part of keeping Sydney as a leader in 21st century urban design and planning is ensuring that not only does the city meet the work-life demands of the population, but does so in an environmentally sustainable manner at every stage. The City has committed to this principle with ambitious Sustainable Sydney 2030 sustainability goals and actively encouraging the City's residents and businesses to adopt and integrate sustainability into their everyday lives. Sustainable Sydney 2030 sets evidence based targets for greening the City, sustainable transport, reduction of carbon emissions, water consumption and waste generation in the City's own operations and across the LGA. Achieving these bold targets will require significant action by the City, the community and business.

In March 2017, the City endorsed the Environmental Action 2016-2021 Strategy and Action Plan. The Environmental Strategy and Action Plan takes the insights, data and actions from the City's suite of environmental strategies and master plans and commits to strong actions on energy, water, climate adaptation, waste, transport and greening over the next five years. Included in the Plan is an action to develop Sustainable Design Technical Guidelines to drive best-practice in the project management of the City's capital works projects.

The City's Sustainable Design Technical Guidelines (SDTG) are designed to assist in achieving this goal by highlighting relevant sustainable practices and design principles for a broad range of projects at their various development stages. The tool is designed to be easily integrated into the City's Project Management framework, allowing users to quickly assess various sustainability options, from early project stage all the way to final hand over. The SDTG are to be read in conjunction with the City's Public Domain Codes when capital works involve public domain improvements.

1.2 Purpose and structure of the tool

This document provides guidance on how to apply sustainability in the design of the City's assets. Describing how sustainability should be applied at each project stage to ensure that sustainability outcomes can be achieved. The SDTG includes the following:

- This Sustainable Design Best Practice Guide, including Contract Brief Schedules suitable to be included in the City's tender documentation, which can be contractually binding for prospective tenderers
- A SDTG tool (a Microsoft Excel based spreadsheet tool) that prompts and documents the process

The two documents are to be used in parallel to achieve sustainability best practice outcomes and meet the expectations of the Sustainability Advisor within the City. The Sustainability Advisor is assigned to projects that have a material sustainability impact on the City's portfolio and will be allocated from the Green Infrastructure or Sustainability Strategy team.

SDTG

Quick how to use the STDG and tool

Use the SDTG and Tool when you are developing a capital works project – the guidance and tool will support the Client/Delivery Manager through the project management lifecycle. Presented below in Figure 1.2 is a step guide outlining the actions to be taken at key stages of the City's Project Management framework.



SDTG Tool

Environmental Management System

Sustainability Aspects	
Energy and Emissions	✓
Water	✓
Climate Resilience	✓
Waste	✓
Materials	✓
Indoor Environmental Quality	✓
Ecology	✓
Transport	✓
Management	✓
Construction Environment Management	✓

Select Asset Type

Other

Generate

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CITY OF SYDNEY

Instructions:

1. Please ensure you have completed the Initiation Brief and Business Case pages before progressing.
2. Please select the project-relevant Environmentally Sustainable Design (ESD) aspects.
3. Please select what asset type is under investigation
4. Press the "Generate" button. This will sort the Project Plan page with the information relevant to the sustainability aspects and asset type selected.
5. On the "Project Aspects" page, from the requirements listed please select the requirements which are applicable to the project at hand and whether they have been incorporated into the design of the project. Please provide any assurance/comments where necessary.
6. To generate a contract brief containing all the desired sustainability aspects, press the "Generate Contract Brief" button once you have completed the Project Plan page.
7. To generate a project completion tracking page, press the "Generate Project Completion".
8. For any other inquiries, please refer to the Sustainable Technical Design Guide (STDG) document provided.

Project Name

Project Number

Enter Project Name

Enter Project Number

Figure 1.1 SDTG Report and SDTG Tool

Step 1	For a new capital works project reference the SDTG and related Tool for guidance on sustainability opportunities (Save a version of the tool in TRIM with the Initiation Brief).
Step 2	When developing an “Initiation Brief”, establish the sustainability aspects related to the project and seek advice from the Sustainability Advisor.
Step 3	For projects that require a business case use the “Business Case” guidance to assess the sustainability impacts and opportunities of the project.
Step 4	When a project has been identified open the Tool and use the “Project Aspects” to identify sustainability aspects and the asset type of the project.
Step 5	When developing the “Project Plan” use the guidance and Tool to assess and identify sustainability aspects for the project. Use this guidance throughout all stages of the project.
Step 6	When a “Contract Brief” is being developed, based on selection in the Project Plan the contract brief requirements will be provided.
Step 7	Track the performance of the Contractor throughout the contract period by completing a review against the “Contract Brief” at project milestones.
Step 8	When the project is being completed check that all the sustainability requirements have been achieved using “Project Completion” in the Tool and ensure all documentation is handed over to the asset owner.

Figure 1.2 SDTG step guide

02 Using the Sustainable Design Technical Guidelines Tool

2.1 Purpose of tool

The STDG tool is a checklist based tool, to support Delivery, Design and Project managers achieve sustainability best practice outcomes by prompting sustainability aspects throughout the project lifecycle, for each of the City's major asset types as shown below in Figure 2.1.

The tool enables the user to address sustainability design opportunities throughout the project management phases. The approach to sustainability is tailored to each stage, and considers what information is available and what steps project teams should be taking in order to address sustainability aspects. Figure 2.2 shows the specific stages where sustainability is addressed by the SDTG Tool.

Asset Type	Example asset
Corporate and Investment	Town Hall House, Sydney Town Hall, Mountain Street, Customs House, 343 George Street
Aquatic Centre and Pools	Gunyama Park Aquatic and Recreation Centre, Cook and Phillip, Ian Thorpe, Andrew Boy Charlton, Prince Alfred Park, Victoria Park
Community Buildings	Green Square Library, Juanita Nielsen Centre, Kings Cross Neighbourhood Service Centre and Library, Ultimo Community Centre, Surry Hills Community Centre
Depots	Alexandra Canal, Bay Street, Epsom Road, Sydney Park Nursery
Parks and Gardens	Perry Park - Recreational Facilities, Drying Green Park, Park upgrades
Public Domain	Villages, Streetscapes, Laneways, Bicycle ways, Public Art
Other	Any other asset type not covered by the above categories

Figure 2.1 The City's asset categories

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making it all happen

Environmental Management System

CITY OF SYDNEY

Initiation Brief

Delivery Manager Sign Off:			
Date:			
Sustainability Advisor Sign Off:			
Date:			

How could the project contribute to sustainability targets?

Design Manager to complete.

Has the Sustainability Advisor provided advice on the sustainability impact of your project?

N/A

Project Name	Enter Project Name
Project Number	Enter Project Number
Client Name	Enter Client Name
TRIM Number	Enter TRIM Number
Initiation Brief Name	Enter Initiation Brief Name
Delivery Manager	Enter Delivery Manager
Sustainability Advisor	Enter Sustainability Advisor

Figure 2.3 Screenshot of the “Initiation Brief” tab

2.2 Initiation Brief

The SDTG tool includes sustainability considerations for the “Initiation Brief” stage. The Initiation Brief is prepared by the Project Client and sets out the business need.

At this stage the user is prompted to respond to key questions which should be considered at an early project stage. The Initiation Brief prompts the user to identify how the project will contribute to sustainability:

- How could the project contribute to sustainability targets?
- Has the Sustainability Advisor provided advice on the sustainability impact of your project? Yes/No

Note: All projects are required to comply with the City's Sustainable Design Technical Guidelines.

A screen shot of the Initiation Brief sheet is provided in Figure 2.3.

This sheet must be reviewed and approved by the Project Client, Delivery Manager and the Sustainability Advisor.

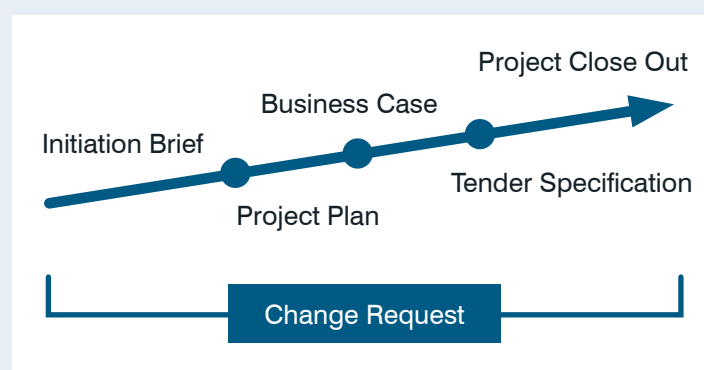


Figure 2.2 Identifies when Sustainability will be included in the City's Project Management Framework

2.3 Business Case

A Business Case explains why the project is being undertaken. It is a decision support and planning tool that considers the likely financial and non-financial results of an action or decision. It is used to involve and inform the management team about the business reasons for significant projects so that they are supported with money, resources and commitment. A good Business Case must use logic and reasoning to link evidence to a recommendation.

The Development Manager is responsible for assessing the Business Case of the project. The SDTG tool provides guidance on the inclusion of sustainability considerations for the “Business Case” stage. At this stage the user is provided with the guidance to complete a high level comparison between a range of options. The comparison is to be complete based on the following key aspects:

- GHG Emissions intensity
- Water intensity

How to undertake a business case based on sustainability/environmental impacts

This assessment will require input from a Sustainability Advisor.

Where the Business Case is for programs of work the Environmental Sustainability Benchmarks document provides guidance. The guide is intended to apply to individual standard projects and to packages of projects where there is already agreement on relevant financial benchmarks e.g. the on-site solar PV program.

The process of assessing sustainability in a Business Case is as follows:

1. Determine what asset type(s) are being considered for the project.
2. Establish whether there are benchmarking criteria for the project, based on type and sizing of the asset, or identify another best practice asset against which to measure the project. The Sustainability Advisor can provide guidance on a benchmark or current best performing asset in each category.
3. Consider the carbon emissions profile of the proposed asset, including an assessment of a potential net-zero building and applicable ratings of the asset type including NABERS, Green Star or other rating as applicable. Refer to the City's Benchmarking and Ratings Policy.

4. Determine the assets predicted operational energy consumption, based on energy modelling. The modelling should consider opportunities for onsite renewable energy generation, energy efficiency and passive design. Guidance on energy modelling is required and would include as a minimum:
 - a) Onsite renewables opportunity estimate (quantified, expressed as an indicative % contribution to total operational energy use)
 - b) Operational electricity and gas consumption
5. Determine the assets predicted operational potable water use, based on water balance modelling. The modelling should consider the following:
 - a) Operational mains potable water use (quantified)
 - b) Onsite rainwater capture/re-use opportunity estimate (expressed as an indicative % contribution to total site water usage)

The user is also asked to provide comments on other sustainability aspects and opportunities which could arise for the project (e.g. If the site location is known and is located within an ecological corridor or wetland) and includes:

- **Water quality impacts on waterways** – This should be expressed as an indicative change of quality against base case e.g. current conditions, for total suspended solids, phosphates and nitrogen.
- **Climate resilience** – outlines where relevant consideration of design requirements for more intense rainfall events, extreme heat and heatwave events, drought, and sea level change.
- **Ecology** – outline impacts on existing habitats/species and opportunities to establish or augment habitats, especially when in close proximity to designated wildlife corridors
- **Transport** – outline opportunities and limitations of active transport (walking and cycling access and end-use facilities), ready access to public transport, and facilities for electric vehicle parking and charging
- **Management** – opportunities to reuse buildings and materials should be identified along with the potential sustainability/environmental impacts of demolition and construction.

Exclusions:

1. Embedded Emissions of the construction: we have excluded the assessment of embedded emissions of construction, to seek further guidance please contact the Sustainability Advisor
2. Asset Environmental Budgeting (Emissions)

Using the Sustainable Design Technical Guidelines Tool

Environmental Management System

Business Case

Design Manager Sign Off:

Date:

Sustainability Advisor Sign Off:

Date:

Project Name

Project Number

Enter Project Name

Enter Project Number

		Option 1			Option 2			Option 3		
	Description									
	Metric (Annual Operational)	Value	Rank	Notes	Metric	Rank	Notes	Metric	Rank	Notes
Energy	kg of CO2 Emissions									
Water	kL									

Additional Comments or Opportunities			
	Option 1	Option 2	Option 3
Water Quality			
Waste			
Climate Resilience			
Ecology			
Management			
Other			

Figure 2.4 Screenshot of the “Business Case” tab

A screen shot of the “Business Case” is presented in Figure 2.4.

This sheet must be reviewed and approved by the Project Client, Delivery Manager and the Sustainability Advisor.

Sustainability Aspects

Energy and Emissions	<input checked="" type="checkbox"/>
Water	<input checked="" type="checkbox"/>
Climate Resilience	<input checked="" type="checkbox"/>
Waste	<input checked="" type="checkbox"/>
Materials	<input checked="" type="checkbox"/>
Indoor Environmental Quality	<input checked="" type="checkbox"/>
Ecology	<input checked="" type="checkbox"/>
Transport	<input checked="" type="checkbox"/>
Management	<input checked="" type="checkbox"/>
Construction Environmental Management	<input checked="" type="checkbox"/>

Select Asset Type

☒ Other

Generate

Instructions:

1. Please ensure you have completed the Initiation Brief and Business Case pages before progressing.
2. Please select the project-relevant Environmentally Sustainable Design (ESD) aspects.
3. Please select what asset type is under investigation
4. Press the "Generate" button. This will sort the Project Plan page with the information relevant to the sustainability aspects and asset type selected.
5. On the "Project Aspects" page, from the requirements listed please select the requirements which are applicable to the project at hand and whether they have been incorporated into the design of the project. Please provide any assurance/comments where necessary.
6. To generate a contract brief containing all the desired sustainability aspects, press the "Generate Contract Brief" button once you have completed the Project Plan page.
7. To generate a project completion tracking page, press the "Generate Project Completion".
8. For any other inquiries, please refer to the Sustainable Technical Design Guide (STDG) document provided.

Project Name	Enter Project Name
Project Number	Enter Project Number

Figure 2.5 Screenshot of the "Project Aspects" tab

2.4 Project Aspects

The SDTG tool "Project Aspects" tab is where the user will complete the sustainability assessment, project asset type and complete the project details including the Delivery/Design/Project manager, Sustainability Advisor, project number and TRIM number as shown in Figure 2.5.

The tool allows the Delivery Manager to filter out aspects that may not be relevant for the project including:

- Energy and Emissions
- Water
- Climate Resilience
- Waste
- Materials
- Indoor Environment Quality
- Ecology
- Transport
- Management

Based on the sustainability aspects and asset type selected, the tool will customise aspects for the project. To assist the user, a best practice sustainability guide has been developed for each sustainability aspect in Section 3 and guidance on each asset type in Appendix A of this report.

The guide represents what is best practice for that asset type, it does not prevent the inclusion of any sustainability aspect. For example, a depot project would usually not be particularly sensitive to ecology, however, if a project were to have a site location within an identified biological corridor, ecology would be a sensitive sustainability aspect.

Figure 2.5 illustrates the layout of the SDTG Tool's user interface on the "Project Aspects" tab. The major information inputs that are required for the SDTG tool are as follows:

- City Property and Projects – Project Delivery team (Delivery/Design/Project Manager)
- Sustainability Advisor
- Project number
- Project name
- TRIM Number
- Checkbox selection of Sustainable Design aspects, based on the relevance to the project:
 - Energy and Emissions
 - Water
 - Climate Resilience
 - Waste
 - Materials
 - Indoor Environment Quality
 - Ecology
 - Transport
 - Management
 - Construction Environmental Management
- Dropdown selection of Asset Type

By completing the above fields, the remainder of the SDTG tool is filtered and customised to the project.

Using the Sustainable Design Technical Guidelines Tool

Environmental Management System

Project Plan

Project Stage:

Asset Type:

Other

Delivery Manager Sign Off:
 Date:
 Sustainability Advisor Sign Off:
 Date:

Generate Contract Brief List

Project Name

Enter Project Name

Project Number

Enter Project Number

Energy and Emissions	Reference Code	Mandatory Requirements	Relevant to Project?	Comments/Assurance	Guidelines and Standards
	ENE1.1	Heating and Cooling - Passive Design • Does the building design incorporate passive heating and cooling features, such as measures to reduce solar gain (e.g. facade shading), insulation to increase thermal performance, allow for cross ventilation and pre-conditioning elements (e.g. basement labyrinth)?	Yes		• NCC 2016 - Section J • Credit 15A, 15J GreenStar D&AB Guidelines v1.1 • Section 3.6 Sydney DCP 2012 • AS1668.4 2012
	ENE1.2	Heating and Cooling - Mechanical Systems • Does the mechanical component of the HVAC design include energy efficiency measures such as economy cycle, mixed mode operation, heat recovery, multiple zoning and occupancy Heating and Cooling - Chillers • Where the building AC load is high (> 200 kW) and cooling towers are practical, install high efficiency water cooled chiller(s) • Choose chiller(s) technology (e.g. digital scroll) that allows low loads as well as high loads to be served efficiently • For moderate building loads (12.5-200kW), or where cooling towers are impractical to install high efficiency, packaged units or variable refrigerant volume type systems. Avoid the use of lighting: Passive Design • Does the lighting design incorporate maximum use of natural daylight considering building orientation and facade, window design, skylights and architectural features conducive to natural light utilisation been considered?	Yes		As Above
	ENE1.3	Lighting: Energy Efficiency • Does the lighting design include LED lighting technology design for all lighting - internal and external and energy efficiency measures such as perimeter zone and photo-electric sensors (to maximise the use of natural light), multiple zones with addressable controls (including occupancy sensors) and a choice of luminaires and lighting levels appropriate to the planned activities?	Yes		As Above
	ENE2.1	Has a Solar PV system been incorporated into the project and does it comply with the City's guidelines?	Yes		The City's Guideline for Solar PV Systems
	ENE2.2	Has a low carbon energy supply (cogeneration or trigeneration) opportunity been investigated in consultation with the Sustainability Advisor. This applies to projects with significant electrical demand, space heating/cooling and/or water heating/cooling demands e.g. pools, libraries, large offices.	Yes		• NCC 2016 - Section J • Credit 6 GreenStar D&AB Guidelines v1.1 • Section 3.6 Sydney DCP 2012 • City of Sydney's Energy and Water Metering Guidelines
	ENE3	Has an energy (electricity and gas) metering and monitoring system been incorporated into the electricity, gas and water systems and can it be integrated into the City's SMART metering system? Does it comply with the City's energy and water metering guidelines?	Yes		• NCC 2016 - Section J • Credit 6 GreenStar D&AB Guidelines v1.1 • Section 3.6 Sydney DCP 2012 • City of Sydney's Energy and Water Metering Guidelines
	ENE4		Yes		
	ENE5		Yes		
			Yes		
			Yes		

Select All

Unselect All

Figure 2.6 Screenshot of the “Project Plan” tab

2.5 Project Plan

The “Project Plan” stage is completed either with the Business Case or the Delivery Manager. The SDTG tool provides guidance on sustainability aspects to be included in the project design.

To access the STDG tool select the link provided in the **Project Plan: Sustainable Design Checklist**. The tool is an Excel document, a version of the tool should be saved in the TRIM project folder with the Project Plan.


The following outlines how to complete the “Project Plan” sheet:

- Identify the stage of the project note that this will depend on the type of project and the stage gate:
 - Concept Design
 - Design Development
 - DA
 - Construction Milestone
 - Construction Completion
- Sustainability aspects are prefilled with the following Energy, Water, Climate Resilience, Waste, Ecology, Indoor Environment Quality, Transport and Management. The aspects displayed are based on the selection entered in the “Project Aspects” sheet.
- The Reference Number is prefilled.
- The sustainability guidance are prefilled fields that include mandatory requirements and additional criteria that are to be considered for project implementation. It is expected that all mandatory requirements are implemented and that additional aspects are implemented on the project where applicable. The Sustainability Advisor will provide supporting advice as required.

- The relevance to the project of each of the above sustainability guidance must be considered by the user and entered as Yes/No/Not applicable.
- Whether the sustainability guidance been incorporated into the project, needs to be entered by the user as either Yes/No/Not applicable.
- Comments/assurance is to be provided by the user against each initiative. Suggested assurance or comments include:
 - Where an initiative is being implemented:
 - Link to concept design drawings
 - Link to QS / costing report including initiative
 - Link to consultant briefing / scope of works
 - Where an initiative is not being implemented:
 - Explanation as to why an initiative is not being adopted
- Guidelines & Standards are prefilled column which include policies and guidelines for reference that provides guidance on why the initiative is being proposed and supports the design decisions.

The user will develop a sustainability strategy for the project based on the yes / no questions above. The Sustainability Advisor is required to sign off on the Project Plan and can be approached for guidance on how to complete this tab. A screen shot of the tab is presented below in Figure 2.6.

Sustainable Design Technical Guidelines



Environmental Management System

CITY OF SYDNEY

Contract Brief

Asset Type:

Other

Print Contract Brief

This specification describes the sustainability performance requirements for the project.
The document intent is to outline the contractor's and any engaged sub-contractors responsibilities in delivering the sustainability performance requirements through all engaged phases of the development.

Project Name

Enter Project Name


Project Number

Enter Project Number

Energy and Emissions	Reference Code	Requirement
	ENE1.1	Heating and Cooling - Passive Design The Contractor shall include in the building passive design heating and cooling features, such as measures to reduce solar gain (e.g. façade shading), insulation to increase thermal performance or allowance for cross ventilation and pre-conditioning elements (e.g. basement labyrinths).
	ENE1.2	Heating and Cooling - Mechanical Systems The Contractor shall include in the mechanical systems design energy efficiency measures such as economy cycle, mixed mode operation, heat recovery, multiple zoning and occupancy sensors etc.
	ENE1.3	Heating and Cooling - Chillers The Contractor shall incorporate a building cooling system that complies with the following: <ul style="list-style-type: none"> Where the building AC load is high (> 200 kWt) and cooling towers are practical, the Contractor must install high efficiency water cooled chiller(s); The Contractor must choose chiller(s) technology (e.g. digital scroll) that allows low loads as well as high loads to be served efficiently; For moderate building loads (12.5-200kWt), or where cooling towers are impractical to install high efficiency, the Contractor must use packaged units or Variable Refrigerant Volume type systems. The Contractor must avoid the use of multiple split DX systems where HVAC is required for two or more spaces and the total building load is greater than 12.5 kWt.
	ENE2.1	Lighting: Passive Design The Contractor shall deliver a passive lighting design with the building orientation and façade configuration, window design and architectural features (eg. Use of an atrium) conducive to effective use of natural light.

Generate Project Completion List

Figure 2.7 Screenshot of the “Contract Brief” tab



Environmental Management System

CITY OF SYDNEY

TRIM No.

Enter TRIM Number

	Milestone Date	Milestone	Has the Contractor complied with the sustainability project plan? (Y/N)	Comments	Reviewer Name	Sustainability Advisor	Review Date
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Figure 2.8 Screenshot of the “Milestone Tracking” tab

2.6 Contract Brief

The SDTG tool includes sustainability considerations for the “Contract Brief” stage. This stage provides the Delivery Manager with a specification which can form part of a contract brief or in the documents listed as ‘Principals’ project requirements’ in Annexure Part N of AS 4902 as applicable. The tender specification is formed based on what the Delivery Manager has selected in the “Project Plan” phase. There are no inputs required of the user at this stage.

When a contract is developed, project milestones require sign off by the Sustainability Advisor. A screen shot of the tab is presented below in Figure 2.7.

2.7 Milestone Tracking

The SDTG tool provides a check and review process to be completed at project milestones. The delivery manager and sustainability advisor are to complete a review of the project sustainability performance against the Contract Brief. The review will determine where corrective action may need to take place. Strong responses can be achieved where the milestones are linked to Contractor payments.

A screen shot of the tab is presented below in Figure 2.8.

Sydney2030 Green Global Connected
city of villages

Environmental Management System

CITY OF SYDNEY

Project Completion

Asset Type:
Other

Print Project Completion

Design Manager Sign Off:
Date:
Sustainability Advisor Sign Off:
Date:

Project Name
Project Number

Enter Project Name
Enter Project Number

Energy and Emissions	Reference Code	Requirement	Has this requirement been satisfactorily completed and signed off by the relevant Project Manager?	Assurance
	ENE1.1	The Contractor has included in the building passive design heating and cooling features, such as measures to reduce solar gain (e.g. facade shading), insulation to increase thermal performance or allowance for cross ventilation and pre-conditioning elements (e.g. basement labyrinth).	N/A	
	ENE1.2	The Contractor has included in the mechanical systems design energy efficiency measures such as economy cycle, mixed mode operation, heat recovery, multiple zoning and occupancy sensors etc.	N/A	
	ENE1.3	The Contractor has incorporated the appropriate design choice below: • Where the building AC load is high (> 200 kW) and cooling towers are practical, install high efficiency water cooled chiller(s); • Choose chiller(s) technology (e.g. digital scroll) that allows low loads as well as high loads to be served efficiently; • For moderate building loads (12.5-200kW), or where cooling towers are impractical to install high efficiency, packaged units or Variable Refrigerant Volume type systems. Avoid the use of multiple split DX systems where HVAC is required for two or more spaces and the total building load is greater than 12.5 kW.	N/A	
	ENE2.1	The Contractor has included in the lighting design passive building elements such as building orientation and facade configuration, window design and architectural features (eg. Use of an atrium) which are conducive to effective use of natural light.	N/A	
	ENE2.2	The Contractor has deliver an energy efficient lighting design which includes the use of LED lighting technology, or other technologies with an improved lighting power density, for all lighting - internal and external (including amenity/facade lighting), and efficiency measures such as perimeter zones and photo-electric sensors, multiple zones with addressable controls (including occupancy sensors) and luminaires and lighting levels appropriate to the planned activities.	N/A	
	ENE3	The Contractor has incorporated a PV system into the project which complies with the City's guideline.	N/A	
	ENE4	The Contractor has considered, and if deemed viable included, a cogeneration or trigeneration system through either on site system or connection to a third party system in order to meet best practice carbon efficiency for the asset.	N/A	
	ENE5	The Contractor has incorporated an energy (electricity and gas) metering and monitoring system into the electricity, gas and water system which can be integrated into the City's SMART metering system and complies with the City's energy and water metering guideline.	N/A	
	ENE6.1	The Contractor has included in the building design the use of solar hot water systems or energy efficient methods such as high coefficient of performance (COP > 3.5) heat pumps, or the use of heat recovery, to produce domestic hot water.	N/A	
	ENE6.2	The Contractor has included in the hydraulic design energy recovery, cogeneration or high COP heat pumps to produce hot water for HVAC (space) and pool heating.	N/A	

Figure 2.9 Screenshot of the “Project Completion” tab

2.8 Project Completion

The SDTG tool includes sustainability considerations for the “Project Completion” stage. This stage has identical inputs to the “Project Plan”, the only difference being that this is completed at the hand over stage of the project to confirm that the strategy planned throughout the “Project Plan” has been adhered to and evidence is available to demonstrate this.

Assurance and comments will differ at this stage as the design has progressed. The Delivery Manager should be able to provide TRIM links for “As Built” drawings, commissioning and tuning reports, contractor monthly updates, photos and confirmations as forms of assurance.

The Sustainability Advisor is required to sign off on the “Project Completion” stage and can be approached for guidance on how to complete this sheet.

The “Project Completion” stage concludes the project lifecycle reported through the SDTG tool.

A screen shot of the tab is presented in Figure 2.9.

2.9 Change Request Management

The Project Management Framework includes change requests, sustainability should be assessed with any change of scope, with the intention of ensuring sustainable outcomes are not lost during project changes. The scope changes to be considered include:

- Is the sustainability strategy significantly changed as a result of this change request?

If the changes are significant, the most recent stage of the SDTG tool must be recompleted to reflect the changed project. The Sustainability Advisor is required to determine the impact of the change and sign off the change request.

2.10 Governance

At each stage of the project a Sustainability Advisor is required to sign off and endorse the proposed sustainability strategy. The Sustainability Advisor will be taking into consideration the project budget, scale and sensitivity to sustainability for The City. It is highly recommended that the Sustainability Advisor is consulted during the sustainability strategy development to ensure a reasonable and accepted pathway is developed, particularly for top tier projects which could have large impacts on the City’s sustainability targets. During the project life the Sustainability Advisor will sign off the sustainability tool related to the project plan at each project milestone.

2.11 Roles and Responsibilities

Individual project management roles for the City are outlined in the City's project management framework. For the purposes of the STDG the primary representatives and their responsibilities have been referred to and include:

The Client is responsible for:

- Preparing the Initiation Brief - ensuring that the business requirements are clearly identified and defined; the project aims, objectives, scope and milestones are defined; and that stakeholders have been identified and consulted, and relevant expertise has been sought during initiation i.e. risk, finance, legal, procurement, communications, community engagement and any technical expertise required
- Identifying both the business benefits to be realised and the criteria that will determine the project's success
- Providing high level oversight throughout the project lifecycle to ensure that the project adheres to the corporate project management process, and that project implementation remains focused on the end objectives so the final products/deliverables will meet expectations and can be used as intended to provide the planned outcomes.
- Chairing Project Team/Working Group meetings and overseeing progress; reviewing and approving project milestones as well as scope and budget changes; escalating unresolved project issues and seeking necessary endorsement or approval for recommendations or project changes by the relevant Director, Steering Committee, Executive or Council as appropriate – including oversight of Council scoping and variation reports.
- Liaising and communicating with the Delivery Manager, internal stakeholders and user groups as required.
- Identifying and managing the availability of any resources required for testing, acceptance and hand over of the deliverables.
- Accepting the final deliverables/products, after ensuring they meet requirements and are fit for purpose.
- Where necessary, overseeing hand over to business as usual - which may involve operational management.
- Benefits management (ongoing assessment of benefits) and undertaking a post-implementation review (if required).

Development Manager: The Development Manager is responsible for the development of the project to the completion of the approved option stage to the satisfaction of the Client. The Project Development Manager will work closely with the Client to develop the project needs and objectives, consult with stakeholders to understand and take into account their specific project issues, manage consultants undertaking investigations and preliminary development activities and develop the project documentation required to achieve approval of those project gates relevant to the size and complexity of the project. Development Managers are accountable for identification and analyses of options and alternate solutions. They work with internal and external stakeholders to balance a range of needs and prepare a business case to support a proposed solution.

Delivery Manager: The Delivery Manager is responsible for taking the project from the preferred option stage to final completion and handover working with both Design and Project Managers. The Project Delivery Manager is responsible for ensuring the project is delivered on time, within the approved budget to the scope as agreed with the Client and in a safe and efficient manner.

Design Manager (capital projects): The Design Manager is responsible for the design & specification of the technical aspect of the project; the Design Manager works in close collaboration with the Project Manager and Client during concept/design development and detailed design stages of a project. They should also assist the Project Manager in the completion and lessons learned stages of a project.

Project Manager: The Project Manager plans and manages the project's day-to-day activities to produce the required products/deliverables, to the required standard of quality and within the specific constraints of time and cost. The Project Manager may change for different stages of the project's delivery.

Sustainability Advisor: A representative of the Green Infrastructure team is responsible for signing off and endorsing the strategy at each stage of the project. A member from the Sustainability Strategy team or the City Projects and Property Sustainability Manager could also be assigned as the Sustainability Advisor for the project.



03 Sustainable Design Best Practice Guide

3.1 Introduction

This section of the SDTG provides guidance to Delivery, Design and Project Managers on how to achieve best practice sustainability for their project. Each asset is sensitive to a different range of sustainability aspects, based on the activity within and the nature of the asset type.

The SDTG are to be read in conjunction with the City's Public Domain Codes when capital works involve public domain improvements including streets, footpaths, landscaping, public spaces including parks:

- Sydney Streets Code 2013
- Sydney Lights Code
- Sydney Signage Code (currently being updated)
- Sydney Draft Parks Code (currently being updated).
- The Sydney Streets Technical Specifications 2013 is the companion document to the public domain design codes.

The City is also a member of Green Building Council Australia (GBCA) and staff have access to GBCA resources by registering at <http://new.gbca.org.au/>.

Following the guidance section for each sustainability requirement for inclusion in the Sustainability Contract Brief, which is the contractual requirement to be met by the Contractor. These requirements are generated automatically when using the SDTG Tool.

3.2 Energy and Emissions

Assets should be designed and constructed to reduce overall greenhouse gas emissions from operations by controlling energy demand, applying energy efficiency principles and taking opportunities to generate green energy from alternative sources. The aim is to encourage initiatives that reduce carbon through:

- reducing energy demand on assets through passive design
- highly energy efficient services and systems design
- low or zero carbon energy supply

3.2.1 ENE1.1 Heating and Cooling: Passive Design

MANDATORY: A passive thermal design will reduce heating and cooling demands within a space, reducing the need for air conditioning. Passive design should take priority in a design, by reducing the thermal loads in a space, energy savings can be achieved, regardless of how efficient the air conditioning system is. A passive design strategy for reduced heating and cooling requirements including:

- Building orientation optimisation
- Avoidance of excessive areas of east or west facing glazing where not effectively shade-controlled
- North facing windows for daylight penetration
- Natural cross ventilation, use of heat chimneys to create air flow and remove hot air etc
- Measures to increase or expose internal exposed mass to create thermal inertia
- Outside air preconditioning, such as via basement labyrinths, or similar measures

Further Guidance: [Credit 15A, 12.1 GreenStar D&AB Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall include in the building passive design heating and cooling features, such as measures to reduce solar gain (e.g. façade shading), insulation to increase thermal performance or allowance for cross ventilation and pre-conditioning elements (e.g. basement labyrinths).

3.2.2 ENE1.2 Heating and Cooling: Mechanical Systems

MANDATORY: Mechanical components of the HVAC design should include energy efficiency measures such as economy cycle, mixed mode operation (passive and mechanical ventilation, heat recovery, multiple zoning and occupancy sensors. A good mechanical design with energy efficient features can vastly improve energy efficiency for a project.

Further Guidance: [Credit 15A, 12.1 GreenStar D&AB Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall include in the mechanical systems design energy efficiency measures such as economy cycle, mixed mode operation, heat recovery, multiple zoning and occupancy sensors etc.

3.2.3 ENE1.3 Heating and Cooling: Chillers

MANDATORY: High efficiency chillers and cooling systems can bring significant energy savings and operational cost savings. Guidance on the appropriate approach to cooling systems is provided as follows:

- Where the building AC load is high (> 200 kW_r) and cooling towers are practical, install high efficiency water cooled chiller(s).
- Choose chiller(s) technology (e.g. digital scroll) that allows low loads as well as high loads to be served efficiently
- For moderate building loads (12.5-200kW_r), or where cooling towers are impractical to install high efficiency, packaged units or Variable Refrigerant Volume type systems. Avoid the use of multiple split DX systems where HVAC is required for two or more spaces and the total building load is greater than 12.5 kW_r

Further Guidance: [Credit 15A, 12.1 GreenStar D&AB Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall incorporate a building cooling system that complies with the following:

- Where the building AC load is high (> 200 kW_r) and cooling towers are practical, the Contractor must install high efficiency water cooled chiller(s);
- The Contractor must choose chiller(s) technology (e.g. digital scroll) that allows low loads as well as high loads to be served efficiently ;
- For moderate building loads (12.5-200kW_r), or where cooling towers are impractical to install high efficiency, the Contractor must use packaged units or Variable Refrigerant Volume type systems. The Contractor must avoid the use of multiple split DX systems where HVAC is required for two or more spaces and the total building load is greater than 12.5 kW_r.

3.2.4 ENE2.1 Lighting: Passive Design

It is recommended that a lighting plan be developed for the project to ensure the most efficient lighting options are delivered for all areas of the project.

MANDATORY: The project design should include optimised daylighting for passive design including considering building orientation and façade, window design, skylights and architectural features (e.g. use of an atrium) conducive to effective use of natural light and where heat gains/losses are controlled.

Further Guidance: Credit 15A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall deliver a passive lighting design with the building orientation and façade configuration, window design and architectural features (eg. Use of an atrium) conducive to effective use of natural light.

3.2.5 ENE2.2 Lighting: Energy Efficiency

MANDATORY: LED lighting technology (or other technology with an improved lighting power density – watts per square metre) must be implemented for all internal and external artificial/ amenity/façade lighting. LED is currently the best available technology and is a strong preference for the City. Particular care should be taken to ensure internal and external lighting designs utilise LED wherever possible. Lighting design should include energy efficiency measures such as:

- perimeter zones
- multiple zones with addressable and programmable controls (including occupancy sensors)
- photo-electric sensors (to maximise the use natural light)
- lighting levels appropriate to the planned activities

The above initiatives will allow the minimisation of lighting energy consumption, through the advanced controlling of lighting.

Further Guidance: Credit 15A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall deliver an energy efficient lighting design including LED lighting technology (or other technology with an improved lighting power density – watts per square metre) lighting design for all lighting - internal and external (including any amenity/facade lighting) and efficiency measures such as perimeter zones and photo-electric sensors, multiple zones with addressable controls (including occupancy sensors) and luminaries and lighting levels appropriate to the planned activities.

3.2.6 ENE3 Solar PV System

MANDATORY: Solar PV system must be installed on all new buildings and major renovations and must comply with the City's Guidelines for Solar Photovoltaic (PV) Panel Installation on City Assets. The Sustainability Advisor must be consulted and will provide advice on installation options.

Sustainability Requirement

The Contractor shall incorporate a solar photovoltaic system within the project. The system shall comply with the City's policy of solar photovoltaic in terms of technical design, delivery and operations.

3.2.7 ENE4 Low Carbon Energy Supply

MANDATORY: Low carbon energy supply (cogeneration or trigeneration) opportunities are to be determined in consultation with the Sustainability Advisor. This applies to projects with significant space heating/cooling and or water heating/cooling demands e.g. pools, libraries, large offices.

Further guidance:

- NCC 2016 – Section J
- Credit 6 Green Star Design and As Built Guidelines v1.1
- Section 3.6 Sydney DCP 2012

Sustainability Requirement

The Contractor shall consider the inclusion of a cogeneration system or trigeneration system through either an onsite system or connection to a third party system in order to meet best practice carbon efficiency for the asset.

3.2.8 ENE5 Energy Metering

MANDATORY: A metering and monitoring system must be installed for all major energy (electricity and gas) usages and be integrated into the City's SMART utility monitoring system.

Further Guidance: Credit 6 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall incorporate an energy (electricity and gas) metering and monitoring system into the electricity, gas and water system which can be integrated into the City's SMART metering system and complies with the City's energy and water metering guideline.

3.2.9 ENE6.1 Hot Water Systems: Domestic

MANDATORY: Production of hot water for domestic hot water should make use of energy recovery from co/trigeneration or high COP heat pumps. Projects should avoid the use of traditional gas fired domestic hot water boiler systems. Electric resistive element water heaters shall not be used.

Further Guidance: Credit 15A, Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

Hot Water System - Domestic

The Contractor shall include a solar hot water systems or energy efficient method such as high coefficient of performance (COP > 3.5) heat pumps, or the use of heat recovery to produce domestic hot water.

3.2.10 ENE6.2 Hot Water Systems: Facility Heating

MANDATORY: Production of hot water for facility and process heating (eg pool heating) should make use of energy recovery from co/trigeneration or high COP heat pumps. Projects should avoid the use of traditional gas boiler hot water systems.

Further Guidance: Credit 15A, Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall include in the hydraulic design energy recovery, co/trigeneration or high COP heat pumps to produce hot water for HVAC (space) and pool heating.

3.2.11 ENE7 Minimum Code Compliance

MANDATORY: All projects must exceed minimum compliance with minimum legislated codes, standards and guides for energy efficiency and emissions. Contractors should demonstrate this through project and manufacturer documentation.

Sustainability Requirement

The Contractor shall demonstrate compliance with National Construction Code 2016 Minimum Energy Performance Standards, and any Australian Standards relevant to various aspects of energy efficiency (eg AS1668, AS1680).

3.2.12 ENE8 JV3 Reporting

MANDATORY: Energy modelling must be completed in accordance with the methodology and reporting requirements set out by the City.

Sustainability Requirement

The Contractor shall complete NCC Section J JV3 Energy Efficiency modelling analysis which has been carried out in accordance with the methodology and reporting requirements set by the City.

3.2.13 ENE9 Energy Modelling

When undertaking a Business Case assessment, the asset should be modelled in order to predict annual energy consumption in kilowatt hours per annum (kWh/annum) and Greenhouse Gas emissions (kg CO₂/annum). The performance should be compared to an equivalent “reference” building. Information on appropriate selection of reference buildings can be provided by the Sustainability Advisor.

The elements for modelling energy savings include:

- Building envelope thermal performance
- Lighting efficiency
- Heating, ventilation and air conditioning systems
- Building Monitoring and Controls Systems (BMCS), modelled as per proposed building operational strategy
- On-site renewable energy generation – which should be considered alongside all practical energy efficiency measures being implemented
- All process energy consumption (industrial process or pool systems)

Energy modelling must be completed in accordance with the methodology and reporting requirements set out by the City. Further guidance:

- Credit 15E Green Star Design and As Built Guidelines v1.1
- GHG Emissions Reduction - Modelled Performance
- NABERS Guide to Building Energy Estimation and NABERS Guide to Tenancy Energy Estimation
- ASHRAE Standard 90.1-2016 -- Energy Standard for Buildings Except Low-Rise Residential Buildings

Sustainability Requirement

The Contractor shall complete predictive energy modelling in accordance with City's Guidelines on energy modelling.

3.2.14 ENE10 Pumps

Where mains and/or recycled water pumping equipment will be installed (e.g. parks), the performance standard is to be certified as “high energy efficiency” rated. The Sustainability Advisor should be consulted on where this is required.

Where pumps have a variable flow rate (chilled water pumps, heating hot water pumps, condenser water pumps etc), the pump motor should be fitted with a Variable Speed Drive (VSD). VSD's allow for pump motors to reduce energy consumption when there is only partial demand on the system.

Sustainability Requirement

The Contractor shall include high efficiency water pumps, motors and variable speed drives on all potable, recycled, firefighting, chilled water and hot water systems.

3.2.15 ENE11 Improvement on NCC Section J

The National Construction Code, Volume 1 Part J Energy Efficiency sets the minimum mandatory energy efficiency performance requirements for all buildings in Australia. Projects should be targeting improvements over the minimum mandatory requirements for energy efficiency benefits. The areas where the biggest energy savings can be achieved have been targeted and are:

- Building envelope, pipework and ductwork insulation increase
- Glazing performance improvement (for more information on energy efficiency performance refer the [Window Energy Ratings](#)).
- Pumps and fans efficiency improvement
- Heating hot water generator efficiency improvement
- Cooling systems with a COP improvement

Further Guidance: [Credit 15A Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall include in the design:

- Building envelope, pipework and ductwork insulation with a 15% improvement in insulation performance on NCC Section J requirements;
- Glazing performance no greater than 85% of the allowable performance level under the NCC Section J Glazing Calculator;
- Heating and cooling water pumps and fans with an efficiency improvement of 15% over minimum NCC Section J requirements;

- Heating hot water generators with at least an efficiency improvement of 15% over minimum NCC Section J requirements;
- Cooling systems with a COP improvement of 15% over minimum NCC Section J or MEPS requirement

3.2.16 ENE12 Appliance Energy Efficiency

All new star-rated electrical appliances are to meet high efficiency star rating standards and where no star rating is available they should fall within the “high efficiency” band under Australian Standards or Greenhouse and Energy Minimum Standards (GEMS). GEMS and Minimum Energy Performance Standards (MEPS) are interchanged in some cases, the star ratings are equivalent for the purposes of this requirement.

Further Guidance: [Credit 15A Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall comply with the following GEMS minimum efficiency requirements for the installed appliances:

- 4 Star GEMS rated refrigerators (or “high efficiency” where commercial);
- 3 Star GEMS rated clothes dryers;
- 4 Star GEMS rated washing machines;
- 4 Star GEMS rated dishwashers;
- 4 Star GEMS rated fridge / freezers;
- 4 Star GEMS rated freezers.

3.2.17 ENE13 Aquatic Centre Mechanical Design

AQUATIC CENTRES ONLY: Consideration must be given in the architectural and mechanical services design to position fans away from pool surfaces. Minimising air movement across the pool surface can reduce evaporation rates, which will reduce heating energy consumption on heated pools.

Sustainability Requirement

The Contractor shall include a mechanical system to minimise evaporation rates.

3.2.18 ENE14 Aquatic Centre Pool Temperature

AQUATIC CENTRES ONLY: Consideration must be given in the pool heating temperature set point. By reducing pool temperature set point, pool heating requirements will be reduced, resulting in significant energy savings. Different pools have temperature requirements specific for the use of that pool (eg hydrotherapy), as such the function of the pool should be considered if the temperature set point is being lowered.

Sustainability Requirement

The contractor shall provide a reduced pool temperature set point in order to reduce operational heating costs.

3.2.19 ENE15 Aquatic Centre Pool Cover

AQUATIC CENTRES ONLY: All aquatic centres should be provided with pool covers to minimise evaporation and heat loss when not in use.

Sustainability Requirement

The contractor shall provide a pool cover to reduce heat loss and evaporation when not in use.

3.2.20 ENE16 Aquatic Centre Pool Solar Heating

AQUATIC CENTRES ONLY: All aquatic centres should include a solar hot water system within the design for pool heating purposes. The system can be either a primary heat system or a booster system to provide pre heating prior to another primary system.

Sustainability Requirement

The contractor shall provide a solar hot water heating system, to provide heating to the pool either as a primary system or a booster system.

3.3 Water

Assets should be designed and constructed to reduce overall potable water consumption and address water run off quality and volume issues from operations. The aim is to encourage initiatives that:

- reduce the consumption of potable water through measures such as the incorporation of water efficient fixtures and building systems and installing and connecting to recycled water supply solutions
- improve the quality and rate of stormwater runoff and reduce impacts of stormwater being discharged from the site.

3.3.1 WAT1 Water Metering

MANDATORY: A metering and monitoring system must be installed for all major water sources and uses (potable, recycled, rainwater etc) and must be integrated into the City's SMART utility monitoring system. The Sustainability Advisor must be consulted on metering and monitoring. Separate metering should apply to (but not limited to) cooling towers, irrigation systems, wash down systems, kitchens, bathrooms/toilets. If non-potable water is used on site, meters shall be installed to understand water use from each non-potable source.

Further Guidance: Credit 6 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall incorporate a water (potable and recycled water) metering and monitoring system which can be integrated into the City's SMART metering system and complies with the City's energy and water metering guideline.

3.3.2 WAT2 Recycled Water Connection

MANDATORY: The project must, aim to utilise an alternative water source for non-potable demands such as, toilet flushing, clothes washing, vehicle washing and other wash-down uses, grounds irrigation and, where the alternative water is suitable, cooling towers

If a water recycling network, compliant with the relevant water recycling standards is available, then the project should connect to that network

Further Guidance:

- Credit 18A Green Star Design and As Built Guidelines v1.1
- Australian Guidelines for Water Recycling - Augmentation of Drinking Water Supplies, May, 2008: <http://agriculture.gov.au/SiteCollectionDocuments/water/water-recycling-guidelines-augmentation-drinking-22.pdf>

If a recycle water network is not yet available, the project should make provisions for one, by dual plumbing to non-potable water end uses.

Sustainability Requirement

The Contractor shall include either a connection to a recycled water network where a scheme is available in the immediate vicinity, or shall make provision for dual plumbing to non-potable end uses.

3.3.3 WAT3.1 Stormwater: Compliance

MANDATORY: The City stormwater quality target are a 50% reduction in the annual solid pollution load and 15% reduction in the annual nutrient load discharged to waterways via stormwater by 2030. To meet these targets Water Sensitive Urban Design (WSUD) not only addresses the issue of stormwater pollutants being discharged to our waterways but also provides the benefits of contributing to cooler micro climates and biodiversity of plant species.

Where the capital works comprise alterations entirely within an existing building these requirements typically will not apply. When works include new buildings/structures, or additions to existing buildings/structures the requirements will apply.

Noting that compliance with DCP Stormwater Management are minimum mandatory requirements, the project must at a minimum comply with section 3.7 of the Sydney DCP 2012, the City of Sydney WSUD & Stormwater Infrastructure Report, and Public Domain Codes including Part 4A of the Sydney Street Technical Specifications.

Preferred solutions to achieve compliance include:

- Implement WSUD solutions, several solutions are available including permeable pavers, verge gardens and nature strips, infiltration units, wetlands and raingardens (bi-retention units and filtration) and installation of gross pollutant and sediment trapping devices.
- Raingardens (also known as bio-retention devices) are preferred WSUD streetscape devices because they:
 - are simple and resilient WSUD elements as they incorporate physical, chemical as well as biological breakdown of pollutants;
 - are practical devices to integrate in streetscapes and the public domain and
 - provide the multiple benefits of filtering stormwater along with enhancing the biodiversity and contributing to cooler microclimates.

Further Guidance: City's Decentralised Water Master Plan 2012 - 2030.

Credit 18A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate compliance or exceedance the stormwater management requirements for:

- Section 3.7 of the Sydney DCP 2012
- Part 4A Sydney Street Technical Specifications
- City of Sydney's WSUD & Stormwater Infrastructure Report
- The City of Sydney's Parks Design Code.

3.3.4 WAT3.2 Stormwater: Volume

MANDATORY: As part of compliance with section 3.7 of the Sydney DCP 2012, the City of Sydney WSUD & Stormwater Infrastructure Report, and Public Domain Codes including Part 4A of the Sydney Street Technical Specifications, the project must comply with stormwater discharge volume requirements as per section 3.7.2 of the Sydney DCP 2012.

Further Guidance: City's Decentralised Water Master Plan 2012 - 2030.

Credit 18A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate compliance with the management of volume stormwater run-off as per section 3.7.2 of the Sydney DCP 2012 and part 4A Sydney Street Technical Specifications.

3.3.5 WAT3.3 Stormwater: Pollution

MANDATORY: As part of compliance with section 3.7 of the Sydney DCP 2012, the City of Sydney WSUD & Stormwater Infrastructure Report, and Public Domain Codes including Part 4A of the Sydney Street Technical Specifications, the project must comply with stormwater discharge quality requirements as per section 3.7.3 of the Sydney DCP 2012 including:

- reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;
- reduce the baseline annual pollutant load for total suspended solids by 85%
- reduce the baseline annual pollutant load for total phosphorous by 65%; and
- reduce the baseline annual pollutant load for total nitrogen by 45%.

Except for small scale works undertake MUSIC modelling to estimate stormwater pollution reduction.

Further Guidance: City's Decentralised Water Master Plan 2012 - 2030.

Credit 18A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate a reduction of baseline annual pollutant load:

- for litter and vegetation larger than 5mm by 90%;
- for total suspended solids by 85%;
- for total phosphorous by 65%.
- for total nitrogen by 45%.

3.3.6 WAT4 Fixtures, Fittings and Appliances

The project must install water efficient fixtures and fittings including the following as a minimum for improved water efficiency:

- Taps with motion sensor based timers – 5 Star WELS rating
- Urinals – Waterless (if included)
- Toilets – 4 Star WELS rating, dual flush mandatory
- Shower roses – 3 Star WELS rating (at least <9L/min, ideally rated < 7.5 litres/min) and with individual piezo switch times (or similar)
- Clothes Washing Machine – 4 Star WELS rating
- Dishwasher – 5 Star WELS rating

Further Guidance: Credit 18A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate compliance with the following WELS water efficiency requirements:

- Minimum 5 Star WELS rated taps.
- Waterless urinals (if urinals are included);
- Minimum 4 Star WELS rated toilets (4.5L/full flush, 3.0L/half flush);
- Minimum 3 Star WELS rated showers (7.5 – 6.0L/min);
- Minimum 4 Star WELS rated washing machines;
- Minimum 5 Star WELS rated dishwasher.

3.3.7 WAT5 Alternative Water Use

Regardless of whether or not there is a connection to a recycled water network, the project should include an onsite alternative water source including rainwater or bore water:

- Rainwater collection, storage and reuse for non-potable water demands is an effective and inexpensive method to reduce potable water consumption.
- Bore water use for non-potable water demands is an effective and inexpensive method to reduce potable water consumption and should be considered if groundwater quality at the site is suitable with minimal treatment.

Further Guidance: Credit 18A Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall include alternative water sources for all non-potable water demands including rainwater and bore water use.

3.3.8 WAT6 Landscape Design

The landscape design should be based on xeriscaping principles or, if it requires some irrigation, the design should incorporate moisture sensing to schedule watering and use efficient drip or micro-jet emitters.

Further Guidance: Credit 18A, 18B Green Star Design and As Built Guidelines v1.1

*Sydney Landscape Code Volume 1 2015;
Sydney Landscape Code Volume 2 2015*

Sustainability Requirement

The Contractor shall provide one of the following options to reduce irrigation demand:

- Moisture sensing drip irrigation system for all landscaping;
- Xeriscape (waterless) landscaping.

3.3.9 WAT7 Aquatic Centre Mechanical Design

AQUATIC CENTRES ONLY: Consideration must be given in the architectural and mechanical services design to adopting measures to minimise pool water evaporation, such as the use of pool covers, positive pressure HVAC, and measures to reduce airflow across the pool surface (careful location of fans for example).

Sustainability Requirement

The Contractor shall include a water sensitive mechanical design to minimise evaporation rates (e.g. orientation of fans away from pool surface).

3.3.10 WAT8 Aquatic Centre Sunlight Exposure

AQUATIC CENTRES ONLY: Direct sunlight exposure to surface water will increase evaporation rates for pool. Steps should be taken to minimise the exposure to sunlight for improved water efficiency.

Sustainability Requirement

The Contractor shall minimise the pool's exposure to direct sun to reduce evaporation.

3.3.11 WAT9 Aquatic Centre Wind Exposure

AQUATIC CENTRES ONLY: Direct wind exposure to surface water will increase evaporation rates for pool. Steps should be taken to incorporate natural or building wind breaks of external pools to limit evaporation of pool water.

Sustainability Requirement

The Contractor shall include wind breaks for outdoor pools.

3.4 Climate Resilience

3.4.1 CRI1 Climate Resilience

MANDATORY: All assets within the City's portfolio should consider Climate change as a future impact on the asset. Our city is expected to be three times more prone to heatwave; and extreme storms or flash flooding events will be twice as likely by 2070. Climate change is a key risk item to assets with long design lives which have been designed based on historical climate data. The first step for any project is understanding what the climate risks are to the project, and secondly developing mitigation strategies to address climate risks. The design should consider the impacts and mitigation of the key climate risks identified in the City's Adapting for Climate Change Strategy.

Further Guidance: Credit 3 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall incorporate into the design mitigation against major climate risks and potential consequences as per the City's Adapting for Climate Change Strategy. The Contractor shall demonstrated that the design addresses:

- Sea level rise risk (circa 90cm by 2100);
- Extreme heatwave and heatwave risk;
- Storm events and extreme rainfall (flooding);
- Periods of reduced rainfall and extended drought;
- Risk for periods of air pollution.

3.5 Waste Management

The City's vision for waste and resource recovery is to send as little waste to landfill by 2030 as possible. The City aims to achieve this by encouraging waste avoidance in the first place, then materials reuse, recycling, promoting innovation in the way waste and materials are managed and demonstrating leadership in sustainable waste management.

The City has adopted the following waste targets:

- 50 per cent resource recovery of waste from City parks, streets and public places by end June 2021
- 70 per cent resource recovery of waste from City managed properties by end June 2021

All City projects need to demonstrate how these targets have been considered and where appropriate are included in design detailing.

3.5.1 WAS1 Policy Compliance

MANDATORY: Projects should identify waste materials streams that will be generated during the operation of the project. These materials and the treatment methods are described in the project Operational Waste Management Plan. The plan is to comply with the City's Waste Strategy, City of Sydney Policy for Waste Minimisation in New Developments and Waste Approvals Policy.

Further Guidance: Credit 8 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate compliance with:

- The City of Sydney's Policy for Waste Minimisation in New Developments;
- The City of Sydney's Draft Waste Strategy and Waste Approvals Policy.

3.5.2 WAS2 Stream Separation

MANDATORY: The Operational Waste Management Plan should include details of on-site waste stream separation for major waste streams.

Further Guidance: Credit 8 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall include waste stream separation of the relevant waste streams including:

- General waste;
- Paper and cardboard;
- Glass;
- Plastic;
- Organics;
- Clinical and Hygiene;
- E-Waste;
- Any other waste stream.

3.5.3 WAS3 Storage Space

MANDATORY: Internal waste storage capacity should be designed considering the following:

- Designed based on dimensions of required waste bins with appropriate design of bin storage and collection areas.
- Designed to minimise odour and reduce the impact of bins on the footpath.

Appropriately sized storage will help reduce overflowing of waste and maximise recycling rates of the various waste streams for the project.

Further Guidance: Credit 8 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall consider dimensions of required waste bins and appropriate design of bin storage and collection areas.

3.5.4 WAS4 Collection Access

MANDATORY: Waste collection areas should be designed taking into the consideration the dimensions of waste collection vehicles to inform minimum height clearance and turning circles access to the building. This will ensure waste can be collected with minimum disruption to the local surrounding areas.

Further Guidance: Credit 8 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall provide a waste collection area in which the dimensions of waste collection vehicles, including minimum height clearance and turning circles for access to the building, is accounted for.

3.6 Materials

All materials selections for the City's assets should be selected considering the embodied carbon content, sustainable manufacturing process, ethical and sustainable supply chain, durability and end of life disposal. Specifically the City aims to address the following:

- Reduce consumption of non-renewable resources by recognising where such resources are consumed and take into account whole life-cycle cost in the procurement of goods, works, services and designs
- Integrate the practice of considering sustainability criteria into the processes of procuring goods, works, services and designs
- Increase recycling of waste materials, the utilisation of waste materials in the manufacture of new products, and the ongoing purchase of these products to support each stage of the recycling process.
- For Projects that City has registered for Green Star Certification it is considered that the Life Cycle Impacts + Sustainable Products credits adequately address City's sustainable procurement agenda.

3.6.1 MAT1 Sustainable Timber

MANDATORY: Timber, as a building material, is good choice as it is a natural and renewable resource. Unfortunately, it can be one of the most environmentally destructive due to illegal exploitation of forests and local communities, poor forestry management and the impacts of global deforestation. The sustainable sourcing of timber is a means of protecting forests by promoting legal, responsible, ecologically sustainable forestry practices.

- Projects are to ensure that timber is sourced with respect for the highest ecological, social and ethical standards through the following in order of preference:
- Re-used or post-consumer recycled timber or sustainable non-timber materials (comprehensive evidence of source required)
- Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC) certified timber suppliers.

Further Guidance: Credit 20.2 Green Star Design and As Built Guidelines v1.1

FSC website: <https://au.fsc.org/en-au>

PEFC website: <http://www.pefc.org/>

Sustainability Requirement

The Contractor shall provide a design which includes at least:

- 95% by cost of all timber sourced sustainably;
- 95% by cost of all timber certified by a forest certification scheme (FSC or PEFC);
- 95% by cost of all timber from a reused source;

Or a design which include at least 95% by cost of a combination of the sources above (COMBINED).

3.6.2 MAT2 Sustainable Steel

MANDATORY: Although the steel making process accounts for between 4% and 5% of total worldwide man-made greenhouse gases, its strength, lightness, durability and recyclability make it one of the most sustainable construction materials available. Projects must reduce the energy and greenhouse gas intensities associated with the production of steel through careful selection of steel manufacturer accreditation and process.

Further Guidance: Credit 20.1 Green Star Design and As Built Guidelines v1.1

Australian Steel Institute.

Sustainability Requirement

The Contractor shall source steel from a manufacturer who is accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI) or was produced using energy-reducing process in its manufacture. An acceptable energy-reducing process is Polymer Injection Technology.

3.6.3 MAT3 Non-Virgin Materials

Use of virgin natural quarried or mined Sub-base / Sub-grade material is common practice for footings, trench-filling etc, but is readily avoided through replacement with existing once-used (or more) materials such as crushed concrete, or recycled road base.

Further Guidance: Credit 19B.1.3 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall source all sub grade / base materials from crushed and recycled sources. The Contractor shall not use any virgin materials.

3.6.4 MAT4 Portland Cement Reduction

The portland cement content within concrete mixes is the most greenhouse gas intense component of the material. Steps to reduce portland cement content will achieve a lower embodied carbon outcome. This can be achieved through either reduced amounts of concrete on the project, or through supplementary cementitious materials (SCM's) such as fly ash or slag as well as many others.

Further Guidance: Credit 19B.1.1 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall achieve a 30% reduction in Portland cement content measured by mass across the project compared to a base case. The Contractor shall use supplementary cementitious materials such as fly ash, slag or other available alternatives. The Contractor shall demonstrate this through the methodology set out in Green Star Design and As Built Credit 19B.1.1.

3.6.5 MAT5 Sustainable Asphalt

Asphalt pavement material is typically 95% mineral aggregates (such as sand or gravel) mixed with 5% petroleum-based bitumen - with bitumen functioning as the glue binding the aggregates in a cohesive mix.

Traditionally, asphalt is produced at temperatures around 160-180°C to optimise the coating of aggregate with bitumen and its laying manageability. Many innovations that attempt to lower the environmental impact of asphalt production centre on reducing the production temperature which reduces the energy (and consequently fuel) that is traditionally required to heat both the binder and the aggregates.

Other impacts of asphalt include contributing to the Urban Heat Island effect, increasing surface runoff due to impermeability, and negatively impacting the quality of the soil beneath.

Projects can reduce impacts from asphalt through the following:

- Implement measures to decrease paved surface area
- Where practicable, use:
 - Alternative processes to traditional 'hot mix asphalt' such as warm or cool mix asphalts which have reduced energy requirements and reduced greenhouse gas emissions.
 - Recycled/reclaimed aggregates such as recycled asphalt pavement, glass and/or concrete.

- Investigate the use of products which:
 - Use bitumen alternatives such as TonerPave™ or Greenpave.
 - Are permeable such as porous asphalt.
 - Store less heat and have lower surface temperatures compared with conventional products.

Further Guidance: Credit 19B.1.2 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall provide sustainably sourced asphalt through the following:

- "Warm mix" or "cool mix" asphalts in place of "hot mix";
- Use of reclaimed or recycled aggregates within asphalt mixes;
- Specific alternative asphalt such as TonerPave or GreenPave.

3.7 Indoor Environment Quality

Indoor Environment Quality aims to enhance the comfort and well-being of occupants including consideration of air quality, acoustics, visual comfort, thermal comfort and indoor pollutants. Humans can spend up to 90% of their life in buildings, and as such building indoor environment quality can have a profound impact on health and wellbeing.

3.7.1 IEQ1 Low VOC and Formaldehyde

MANDATORY: To safeguard occupant health through the reduction in internal air pollutant levels. Internal pollutants can be reduced through selection of the following:

- All paints, adhesives, sealants and carpets to be low VOC
- All engineered wood products to have low formaldehyde limits

Note: clause table numbering refers to numbering from tool Sustainability Requirement output.

Further Guidance: Credit 13.1 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall provide low Volatile Organic Compound (VOC) paints, adhesives, sealants and carpets and low formaldehyde engineered wood products. The Contractor shall use paints, adhesives, sealants, carpets and engineered wood products which comply with Tables 1, 2 and 3 attached.

Table 3.1 Maximum allowable VOC limits for paints, adhesives and sealant products

Product	MAX TVOC content in grams per litre (g/l) of ready to use product (inclusive of any toner).
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Table 3.2 Maximum allowable VOC limits for carpets

Test Protocol	MAX TVOC emission limit
ASTM D5116 - Total VOC limit	0.5mg/m ² per hour
ASTM D5116 - 4-PC (4-Phenylcyclohexene)	0.05mg/m ² per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5mg/m ² per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5mg/m ² per hour

Table 3.3 Maximum allowable formaldehyde emission limits

Test Protocol	Emission limit / Unit of measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤ 1 mg/L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤ 1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤ 1 mg/L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤ 1 mg/L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤ 1 mg/L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤ 1 mg/L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤ 1 mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤ 0.1 mg/m ² hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤ 0.1 mg/m ² hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤ 0.1 mg/m ² hr (at 3 days)
ASTM D6007	≤ 0.12 mg/m ³
ASTM E1333	≤ 0.12 mg/m ³
EN 717-1 (also known as DIN EN 717-1)	≤ 0.12 mg/m ³
EN 717-2 (also known as DIN EN 717-2)	≤ 3.5 mg/m ² hr

3.7.2 IEQ2 Minimised Ventilation Pollution

Ventilation design can improve the user experience, productivity and health and wellbeing. One way projects can address this through reduction of pollution and debris. This can be achieved through:

- Positioning the air intake far from sources of pollution
- Designing a mechanical system for ease of maintenance to clean any build-up of debris or mould
- Cleaning all ductwork prior to occupation

Further Guidance: [Credit 9.1 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide a mechanical ventilation systems with the following features:

- The air intake shall be designed to be far from pollution sources (ASHRAE Standard 62.1.2013)?
- The air handling system shall be designed with access points for ease of maintenance and cleaning such as to maintain HVAC coils, filters etc
- All ductwork shall be cleaned prior to occupation

3.7.3 IEQ3 Fresh Air Flushes

The design should allow for effective (high flow rate) morning fresh air flush, either via the HVAC system or passive ventilation, during the first few months of occupancy to remove any residual VOC outgassing. Allowing for this will release VOC impacts from the building which can ordinarily cause issues during the first few months of building operations.

Further Guidance: [Credit 9.2 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide a design which allows for an effective morning fresh air flush during the first few months of occupancy to remove any residual VOC outgassing.

3.7.4 IEQ4 Natural or Mixed Mode Ventilation

Inclusion of natural or mixed mode ventilation through the provision of operable windows will mitigate the build-up of CO₂ within rooms, and boost air quality in the space.

Further Guidance: [Credit 9.2 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide a naturally ventilated or mixed mode space within the project. The Contractor shall demonstrate that the space will comply with AS1668.4.2012.

3.7.5 IEQ5 Exhaust Systems

Exhaust systems, which may be operable windows, will allow for harmful pollutants to be discharged from the air within the building and should be incorporated for kitchens, print rooms or other polluting areas.

Further Guidance: [Credit 9.3 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide an exhaust system to exhaust from high pollution spaces. The Contractor shall demonstrate, at minimum, exhaust air provisions to kitchens, print rooms and any other polluting areas.

3.7.6 IEQ6 Humidity Control

Humidity control can boost the thermal comfort of occupants within the space, as well as reduce the risk of condensation and moisture build up in the building.

Further Guidance: [Credit 14.1 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall incorporate humidity control within the design. The Contractor shall provide a mechanical system which responds to humidity sensors in the space and ensures a thermally comfortable range of humidity is maintained in the space, and a reduced risk of condensation.

3.7.7 IEQ7 Internal Noise Levels

The acoustic design should comply with the recommendations in AS2107:2000 for both internal noise levels and reverberation levels. The project should also design good performance internal partitions to minimise cross talk and speech privacy issues. An appropriate acoustic design can increase occupant comfort and work productivity.

Further Guidance: [Credit 10 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall ensure all spaces achieve an appropriate internal noise level and internal reverberation level as per recommendations in AS2107.2000.

3.7.8 IEQ8 Lighting Levels

Appropriate lighting, in terms of lighting levels, ceiling design and electric lighting glare reduction can improve the user experience, productivity and health and wellbeing. Projects can address this through a lighting design compliant with AS1680. Fittings should include baffles, louvres, diffusers or a ceiling design to eliminate glare from electric lighting.

Further Guidance: [Credit 11 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall incorporate appropriate internal lighting levels as nominated in AS1680. The Contractor shall provide baffles, louvres, diffusers or a ceiling design which eliminates glare issues from the electric lighting.

3.7.9 IEQ9 Glare Reduction

Glare from sunlight penetration can be addressed the façade design, including features such as awnings, blinds, screens or other devices which reduce the risk of glare impacts and glare discomfort.

Further Guidance: [Credit 12 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide external awnings, internal blinds, screens or other devices which eliminate glare comfort issues within the space.

3.7.10 IEQ10 Access to Daylight and Views

Connection to nature, both in terms of access to views and access to natural sunlight improves user experiences within a building. Project should all be designed to maintain building occupant's connection to nature for improved productivity through façade, floorplate and roof light design.

Further Guidance: [Credit 12 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide a floorplate configuration which provides good access to daylight and views for building users. The Contractor shall design for 60% of the building floorplate to be located within 5m of a window or roof light.

3.7.11 IEQ11 Thermal Comfort

For projects featuring indoor, spaces with permanent workstations / occupancy, thermal comfort can affect occupant comfort and productivity. The design allows for adaptive approaches to thermal comfort such as higher summer and lower winter set points coupled with a degree of occupant control over their immediate environs (e.g. via forms of task air supply and personal radiant heating).

Further Guidance: [Credit 14 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall provide an assessment of thermal comfort within the space. The Contractor shall demonstrate the design achieves the following acceptability limits:

- For naturally ventilated spaces, internal temperatures are within 80% of acceptability limit 1 of ASHRAE Standard 55-2013;
- For air conditioned spaces, the internal conditions achieve Predicted Mean Vote (PMV) levels between -1 and +1 inclusive, calculated in accordance with ASHRAE Standard 55-2013.

3.8 Ecology (Green and Cool City)

The City's Environmental Action 2016-2021 Strategy and Action Plan include targets for enhancing the urban canopy and urban ecology in the green spaces that the City has responsibility for across our local area.

Canopy cover is critical in providing a healthy environment, with benefits including improving thermal comfort and reducing the heat island effect, improving air quality and managing watershed from storm events. The City's targets aim to enhance urban habitat for priority species and the City's capital projects should not result in a net reduction of ecological value.

A referral to the Urban Ecology Coordinator is required specifically for projects with the following characteristics:

- projects within 50m to water bodies (including artificial wetlands, stormwater canals, and coastal areas)
- projects within 100m of identified potential biodiversity linkage area, identified bush restoration areas or areas inhabited by endangered, threatened or vulnerable species, or have been identified as key habitat areas for the City's priority species as identified in the Urban Ecology Strategic Action Plan.
- projects that have potential opportunities to enhance urban habitat for priority species
- new or upgrades to bridges, stormwater culverts and old buildings (over 50 years)

3.8.1 ECO1 Code Compliance

Compliance with the City's Urban Forest Strategy is a minimum requirement for all projects with the above characteristics.

Sustainability Requirement

The Contractor shall demonstrate the project complies with the requirements of the City's Urban Forest Strategy.

3.8.2 ECO2 Ecological Assessment

An Ecological Assessment Report must be prepared by a qualified and appropriately experienced ecologist to:

- determine the likely impacts on flora and fauna species and communities onsite and in the vicinity during demolition, construction and post-construction stages of the proposed development
- outline the mitigation measures that will be undertaken to keep any adverse impacts to a minimum;
- for new or upgrades to public domain or parks reference the Public Domain Codes including the Draft Parks Code, Urban Ecology Strategic Action Plan, Draft Internal Habitat Guidelines.

Sustainability Requirement

The Contractor shall complete an Ecological Assessment and implement the recommendations from that assessment on the project.

3.8.3 ECO3 Arboriculture Assessment

An arboriculture assessment of the trees on the site is required to determine whether the work impacts on existing trees and canopy cover, and to identify ways to enhance the canopy cover over the site. Request an internal referral to Tree Contract Coordinator for clarification of urban forest impacts, application of the City's Arboricultural Consultancy panel, Urban Forest Strategy, Tree Management Policy and Street Tree Masterplan.

Sustainability Requirement

The Contractor shall conduct an arboriculture assessment of the trees on site, to protect trees and enhance canopy cover.

3.8.4 ECO4 Green Walls and Roofs

The City of Sydney encourages the use of green roofs, green walls and facades. Integrating plants into building design is essential to improve our resilience to increasing population pressures and a changing climate.

Green roofs and walls have the potential benefits within an urban context:

- lower energy consumption by providing shade
- reducing the urban heat island (UHI) effect.
- increasing the thermal performance of buildings (lowering energy costs)
- positive effects on stormwater control and improve water sensitive urban design (WSUD)
- improvement of air quality
- reduction of noise pollution
- increase in urban biodiversity and urban food production
- improvement in health and wellbeing

Reference Green Roofs and Walls Guidelines.

Sustainability Requirement

The Contractor shall incorporate a green roof or wall.

3.9 Transport

Aims to facilitate a reduction on the dependency of private car use as an important means of reducing overall greenhouse gas emissions, as well as to encourage the provision of alternative forms of transportation

3.9.1 TRA1 Cyclist Parking

MANDATORY: Compliance with section 3.11.3 of Sydney DCP 2012 is a minimum mandatory requirement to encourage the use of cycling a transportation form. Cycling reduces traffic congestion, brings health benefits and is a low carbon form of transportation.

Further Guidance: Credit 17B Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate compliance with cyclist parking provisions for the project in accordance with section 3.11.3 of the Sydney DCP 2012.

3.9.2 TRA2 Car Share Scheme

MANDATORY: Compliance with section 3.11.2 of Sydney DCP 2012 is a minimum mandatory requirement to encourage the use of car share schemes. Car share schemes bring benefits of shared embodied carbon, by reducing the number of car owners in the City.

Further Guidance: Credit 17B Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall demonstrate compliance with car share parking provisions for the project in accordance with section 3.11.2 of the Sydney DCP 2012.

3.9.3 TRA3 Green Travel Plan

The project must develop a green travel plan which considers multiple sustainable transportation options, communication strategies to users and auditing, reporting and measuring strategies in accordance with the City's guidelines.

Sustainability Requirement

The Contractor shall prepare and implement a Green Travel Plan for the project. The plan was developed in accordance with the guidance available within the planning controls section of the City's website.

3.9.4 TRA4 Active Transportation

Cycling can be further encouraged on a project through providing safe and accessible infrastructure. Bike paths which are separated from the road, well lit, appropriate signage and safe can further encourage the uptake of cycling.

Further Guidance: Credit 17B Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall ensure safe and accessible infrastructure for active transportation options.

3.9.5 TRA5 Walkscore

A site location within walking distance of amenities can greatly reduce car ownership and use. The benefits of a centrally located site, and reduced emissions from reduced transport movements should be considered when selecting a project site.

Further Guidance: Credit 17B Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall ensure site selection achieves a walkscore of at least 80 (<https://www.walkscore.com/>).

3.10 Management

All assets within the City's portfolio should consider engagement of a responsible contractor. A responsible contractor can be identified through the provision of the following key accreditations and evidences:

- ISO 140001 Environmental Management System accreditation and history of compliance
- Evidence of best practice environmental management plan

3.10.1 MAN1 Environmental Management System

All contractor should provide evidence of their Environmental Management System in order to demonstrate that they are an environmentally responsible contractor.

Further Guidance: Credit 7 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall provide evidence of an Environmental Management System.

3.10.2 MAN2 Environment Compliance History

All contractor should provide evidence that they have complied with their Environmental Management System in order to demonstrate that they are an environmentally responsible contractor, are transparent and report on their actual environmental performance.

Sustainability Requirement

The Contractor shall provide evidence demonstrating a history of compliance with their Environmental Management System.

3.10.3 MAN3 Operations and Maintenance Manuals

Operations and maintenance manuals should be developed by the Contractor and handed over as part of the project completion process. Operations and maintenance manuals ensure that all design and construction information and knowledge is transferred to the building operator, enabling them to understand how the project was intended to operate, and how the project should be maintained. Operations and maintenance manuals can enable the project to be run as efficiently as possible throughout the operational phase of the project.

Further Guidance: Credit 4.1, 4.2 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall develop equipment operation and maintenance manuals specific to the project. The Contractor shall ensure that all information developed is issued to the City, and that the manuals cover all equipment within the asset. As a minimum the manual should cover the following systems where present:

- HVAC system;
- Building management and control systems (BMCS);
- Electrical, communications, security, alarms and lighting systems;
- Onsite electrical generation systems;
- Fire protection and fire detection systems;
- Hydraulic system, including gas and any recycled water systems;
- Vertical transportation systems;
- Any other significant systems on the site.

3.10.4 MAN4 Building User Information

Building user information should be developed by the Contractor and handed over as part of the project completion process. Building user information ensure that building users can be informed of what they can do as users, to ensure the building operates as efficiently as possible in the operational phase of the project. User behaviour can play a large role in energy and water performance, with building user information the building users can take responsibility for their component of sustainability performance.

Further Guidance: Credit 4.1, 4.2 Green Star Design and As Built Guidelines v1.1

Sustainability Requirement

The Contractor shall develop building user information and facilitate building user training sessions. The information and training session should cover the following as a minimum:

- Description of initiatives designed to enhance energy efficiency and minimise greenhouse gas emissions and measures that must be taken by users during day-to-day operation to maximise their effectiveness;
- Description of initiatives intended to enhance and minimise water use and the measures that must be taken by users during day-to-day operation to maximise their effectiveness;
- Description of basic function and operation of any nominated building systems that building users may come in direct contact with including any occupant activated controls;
- List of relevant contacts for maintenance information, operational issues, complaints or other feedback (e.g. relevant facilities management contact details and/or online request/feedback form);
- Description of alternative transport initiatives promoted within premises (such as bicycle facilities, end of trip facilities, carpooling or car-share), location of a transport plan (if available);
- Local public transport information, maps and timetables;
- Description of the operational waste requirements for the building users, including what waste streams can or cannot be collected for recycling at the premises.

3.11 Construction Environment Management

Construction environment management is critical to ensuring all projects minimise environmental harm during the construction phase of the project. This can be achieved through the development of plans which aim to limit impacts, and adherence to those plans.

3.11.1 CEM1 Construction Environment Management Plan

MANDATORY: All projects that involve construction require a Construction Environmental Management Plan that is developed specifically for the site. The aim of the Construction and Environmental Management Plan (CEMP) is to ensure that all construction works are carried-out in such a way as to minimise any potential risk to the environment. The CEMP provides a single document that coordinates the implementation of environmental safeguards, controls and mitigation measures, outlining a formal process to manage environmental incidents and complaints during construction. The CEMP must be specific to the project/site and not a 'generic' document. Included in the CEMP are the following sub-plans

Sustainability Requirement

The Contractor shall prepare and implement a Construction Environmental Management Plan for the project.

3.11.2 CEM2 Recycling Rate

MANDATORY: The City's vision for waste and resource recovery is to send as little waste to landfill by 2030 as possible. The City aims to achieve this by encouraging recycling, promoting innovation in the way waste and materials are managed and demonstrating leadership in sustainable waste management.

The City has adopted the target of 80 per cent resource recovery of construction and demolition waste generated and managed by City operations. This is the minimum benchmark projects should set for Contractors to achieve.

Further Guidance: [Credit 22 Green Star Design and As Built Guidelines v1.1](#)

Sustainability Requirement

The Contractor shall achieve a diversion from landfill rate of minimum 80% measured by mass.

3.11.3 CEM3 Erosion and Sediment Control Plan

An Erosion and Sediment Control Plan (ESC) is required when there is potential impact to waterways from runoff of the site and identifies how to minimise these impacts during construction. The best practice guide is the Blue Book which contains design and technical detail for erosion and sediment control and also checklists for site-based projects. Including:

- Site map showing vegetation cover, trees, stockpile locations, site access, existing and proposed drainage patterns with stormwater discharge points,
- Detailed measures as to how erosion and sediment will be controlled - location and type of measures
- Diversion and control of run-off from upslope lands
- Access/egress protection measures
- Site rehabilitation proposal with schedule
- Frequency and nature of maintenance program

The following erosion risk trigger points are to be addressed:

- Is average site slope >10%?
- Is disturbance period greater than 4 months?
- Does project seek to modify existing stormwater flow paths (e.g. open channels converted to drains)?
- Will proposal impact protected or sensitive local environments?
- References ([Managing urban stormwater \(MUS\): soils and construction vol. 1, A Resource Guide for Local Councils – Erosion and Sediment Control, DEC](#))

Sustainability Requirement

The Contractor shall prepare and implement an erosion and sediment control plan for the project.

3.11.4 CEM4 Vegetation Management Plan

A Vegetation Management Plan is required when there is any impact to biodiversity. The plan must identify how impacts to vegetation will be minimised during construction.

An arboriculture assessment of the trees on site is required to determine whether the work impacts on existing trees and canopy cover provided, and to identify ways to enhance the canopy cover over the site. Request an internal referral to Tree Contract Coordinator for clarification of urban forest impacts, application of the City's Arboriculture Consultancy panel, [Urban Forest Strategy](#), [Tree Management Policy](#) and [Street Tree Masterplan](#).

Ensure appropriate controls and procedures are implemented during construction activities to minimise adverse impacts on vegetation as a result of construction of the project, specifically by:

- Implementing vegetation removal and retention in accordance with an arboricultural assessment.
- Protecting vegetation to be retained.
- Reducing the extent of exotic species and eradicating noxious weeds within the projects footprint.
- Identifying and managing fauna habitat values during clearance.
- Maintaining or improving long term fauna habitat values within the areas to be revegetated.
- Ensure appropriate measures are implemented to comply with all relevant legislation and approval requirements.

Sustainability Requirement

The Contractor shall prepare and implement a vegetation control plan for the project.

04 Appendix A: Sustainable Design Best Practice Guide for Asset Types

Corporate and investment

Asset examples: Town Hall House, Sydney Town Hall, Mountain Street, Customs House, 343 George Street

Strong sustainability frameworks exist for Corporate and Investment buildings. Project teams should consult the [City's Benchmarking and Ratings Policy \(TRIM\)](#). Most sustainability rating tools initiating from a focus on commercial buildings. The National Australian Built Environment Rating System ([NABERS](#)) provides a framework to rate the performance of a commercial building in operation for its energy and water consumption. The Green Building Council of Australia's Green Star Design and As Built rating system is applicable to all building type, however is particularly well suited to commercial offices. The Better Buildings Partnership provides a framework for improved operational outcomes. Project teams should consider pursuing certified ratings under the suite of available certification tools for all corporate and investment asset types.

The following sections outline what are sensitive sustainability aspects for Corporate and Investment, and should be included within the SDTG tool.

Energy and emissions

The commercial building sector is the most mature sector in terms of energy measurement and benchmarking due to a highly competitive environment. Reducing energy and emissions can be achieved through design based approaches and specifications on the project. Efforts to reduce energy and emission intensity should be addressed in the following ways:

- Reduce the requirements and demands of energy through the use of passive design strategies including the incorporation orientation optimisation, external shading, north facing windows for daylight penetration, natural or mixed mode ventilation for reduced air conditioning
- Maximising rooftop solar PV system for zero carbon energy supply
- High efficiency building thermal envelope, including walls, floors, roofs and glazing systems
- High efficiency services including fans, pumps, chillers, hot water generators, cooling towers, lighting systems
- Low carbon on site energy systems including cogeneration and trigeneration
- Appropriate SMART metering systems to enable effective energy management in operation

Water

Corporate and investment assets can be water intensive assets. Efforts to reduce water consumption should be addressed in the following ways:

- Reducing the demand for all water through efficient fixtures, efficient appliances, low demand irrigation landscaping
- Supplying non-potable water demands (toilet flushing, urinals, cooling towers and landscaping) through either rainwater capture and storage, connection to utility or private recycled water network scheme
- Appropriate SMART metering systems to enable effective water management in operation

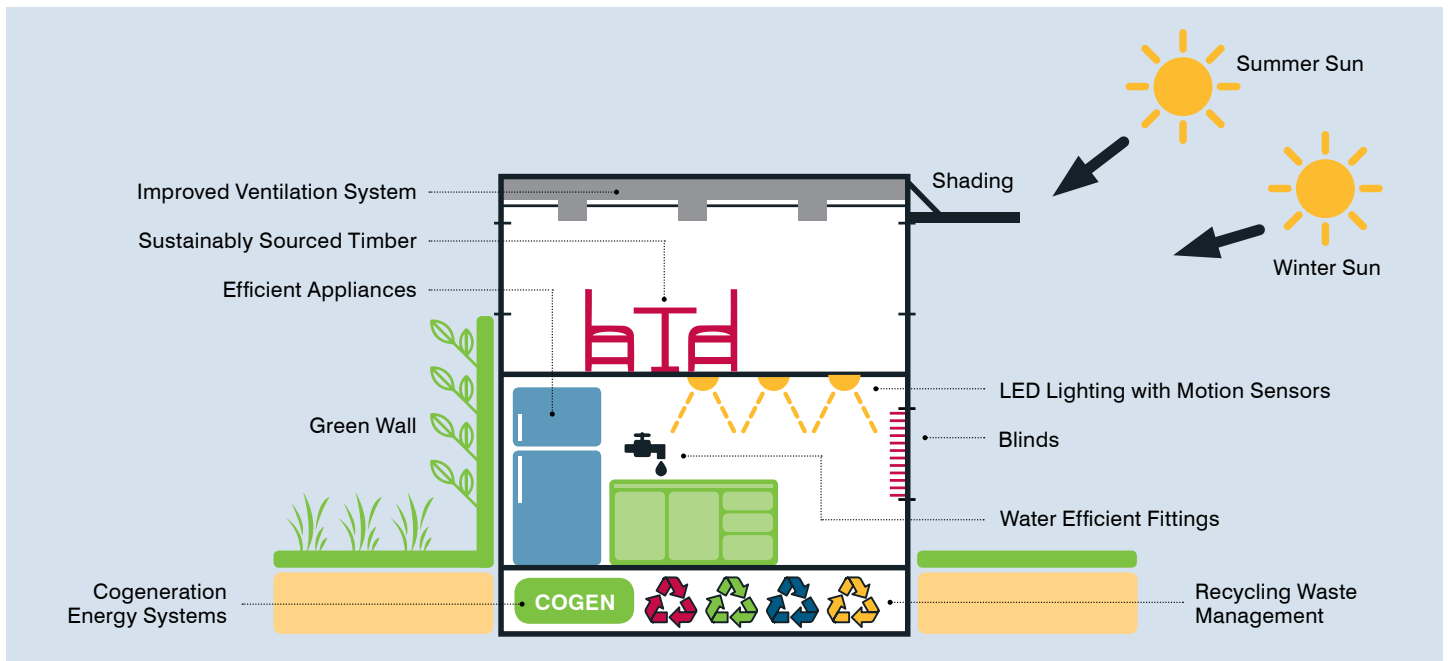


Figure 3.1 Sketch of Corporate and Investment sustainability strategy

Indoor environment quality

Corporate and investment assets are indoor environment quality sensitive assets. Efforts to improve indoor environment quality can be addressed in the following ways:

- Selection of low emission materials, including low VOC paints, adhesives, sealants and carpets, engineered wood products with low formaldehyde emissions
- Design for an improved air quality in the space by incorporating natural or mixed mode air conditioning increased levels of outside air, beyond code compliance (AS1668.2.2012), and exhaust of pollutants
- Improved occupant experience through appropriate noise levels and reverberation level in accordance with AS2107.2000, inclusion of awnings, blinds, screens to control glare and floorplate design to allow access to sunlight and views

Transport

Corporate and investment assets have high densities and regular occupant transport movements. Efforts to address sustainable transport can be addressed in the following ways:

- Provision of cyclist parking and cyclist facilities
- Site selection in close proximity to public transport options

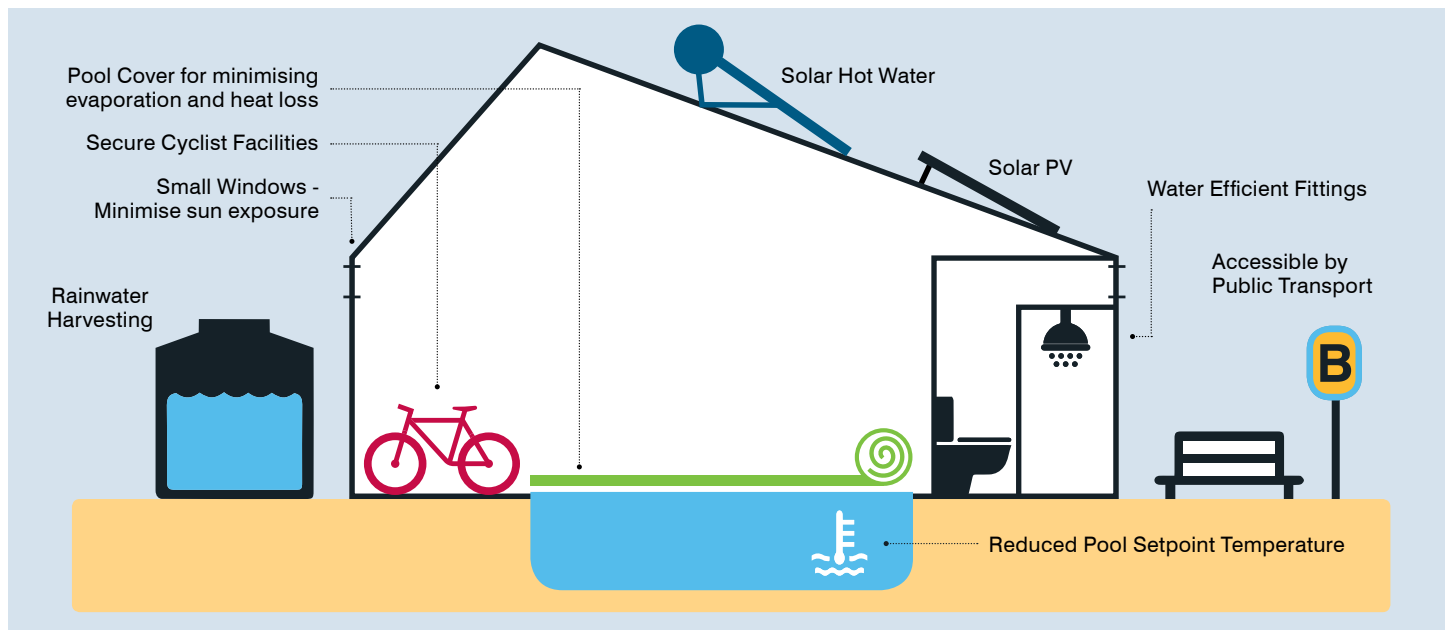


Figure 3.2 Sketch of Aquatic Centres and Pools sustainability strategy

Aquatic Centres

Asset examples: Gunyama Park Aquatic and Recreation Centre, Cook and Phillip, Ian Thorpe, Andrew Boy Charlton, Prince Alfred Park, Victoria Park

Some sustainability frameworks exist for Aquatic Centres, the primary example being Green Star Design and As Built. Whilst an asset could achieve a rating, a strong consideration of the value to the organisation should be determined considering City's Benchmarking and Ratings Policy (TRIM). Aquatic Centres are one of the most energy and water intensive assets for the City and particular care should be taken in designing to ensure water and energy consumption is minimised.

The following sections outline what are sensitive sustainability aspects for Aquatic Centres, and should be included within the SDTG tool.

Energy Emissions

Efforts to reduce energy and emission intensity should be addressed in the following ways:

- A water sensitive mechanical system. By reducing the disturbance of air along the pool surface, reduced evaporation and heat loss can be achieved. All fans should be positioned in order to avoid air movement around the pool surface
- Pool temperature set point reduce downwards for reduced heating load
- Selection of high efficiency pumps and low pressure filters and heat exchangers.
- Solar thermal heating
- Alternative on site generation (microturbine, cogen etc) where Whole of Life analysis shows benefits

Water

Efforts to reduce water intensity should be addressed in the following ways:

- Lower pool temperature set point for lower levels of evaporation
- A water sensitive mechanical system. By reducing the disturbance of air along the pool surface, reduced evaporation can be achieved. All fans should be positioned in order to avoid air movement around the pool surface
- Rainwater harvesting
- Avoid exposure of pool surface to direct sunlight for reduced evaporation
- Provide wind breaks for outdoor pools for reduced evaporation
- Appropriate SMART metering systems to enable effective water management in operation

Waste Management

Waste issues can be addressed through the following initiatives:

Development of an operational waste management plan which addresses transportation, storage, collection, measurement, auditing and on site major stream separation

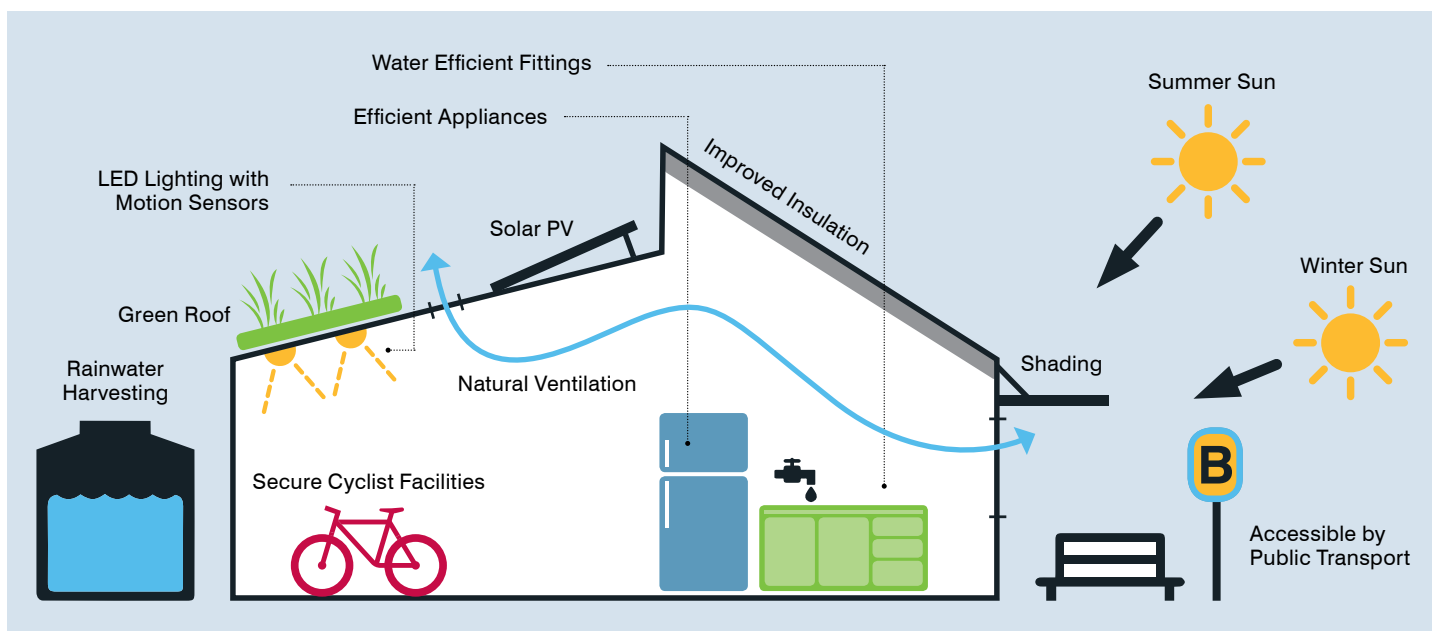


Figure 3.3 Sketch of Community Building sustainability strategy

Community Building

Asset examples: Green Square Library, Juanta Nielsen Centre, Kings Cross Neighbourhood Service Centre and Library, Ultimo Community Centre, Surry Hills Community Centre

Strong sustainability frameworks exist for Community Buildings, with most sustainability rating tools initiating from a focus on commercial buildings, which can be similar in design to a Community Building. Project teams should consult City's Benchmarking and Ratings Policy (TRIM) when considering certification. The Green Building Council of Australia's Green Star Design and As Built rating system is applicable to all building type, and can be well suited to a Community Building. Project teams should consider pursuing certified ratings under Green Star for Community Building asset types where there is sufficient interest.

The following sections outline what are sensitive sustainability aspects for Community Buildings, and should be included within the SDTG tool. The approach to designing a sustainable Community Building does not vary greatly from that of a Corporate and Investment asset type, and as such the approach is largely unchanged.

Energy and Emissions

Efforts to reduce energy and emission intensity should be addressed in the following ways:

- Reduce the requirements and demands of energy through the use of passive design strategies including the incorporation orientation optimisation, external shading, north facing windows for daylight penetration, natural or mixed mode ventilation for reduced air conditioning

- Maximising rooftop solar PV system for zero carbon energy supply
- High efficiency building thermal envelope, including walls, floors, roofs and glazing systems
- High efficiency services including fans, pumps, chillers, hot water generators, cooling towers, lighting systems
- Low carbon on site energy systems including cogeneration and trigeneration
- Appropriate SMART metering systems to enable effective energy management in operation

Water

Efforts to reduce water consumption should be addressed in the following ways:

- Reducing the demand for all water through efficient fixtures, efficient appliances, low demand irrigation landscaping
- Supplying non-potable water demands (toilet flushing, urinals, cooling towers and landscaping) through either rainwater capture and storage, connection to utility or private recycled water network scheme
- Appropriate SMART metering systems to enable effective water management in operation

Waste Management

Waste issues can be addressed through the following initiatives:

Development of an operational waste management plan which addresses the specific needs of the community centre, particularly if there could galleries/exhibitions with high waste churn. Waste transportation, storage, collection, measurement, auditing and on site major stream separation

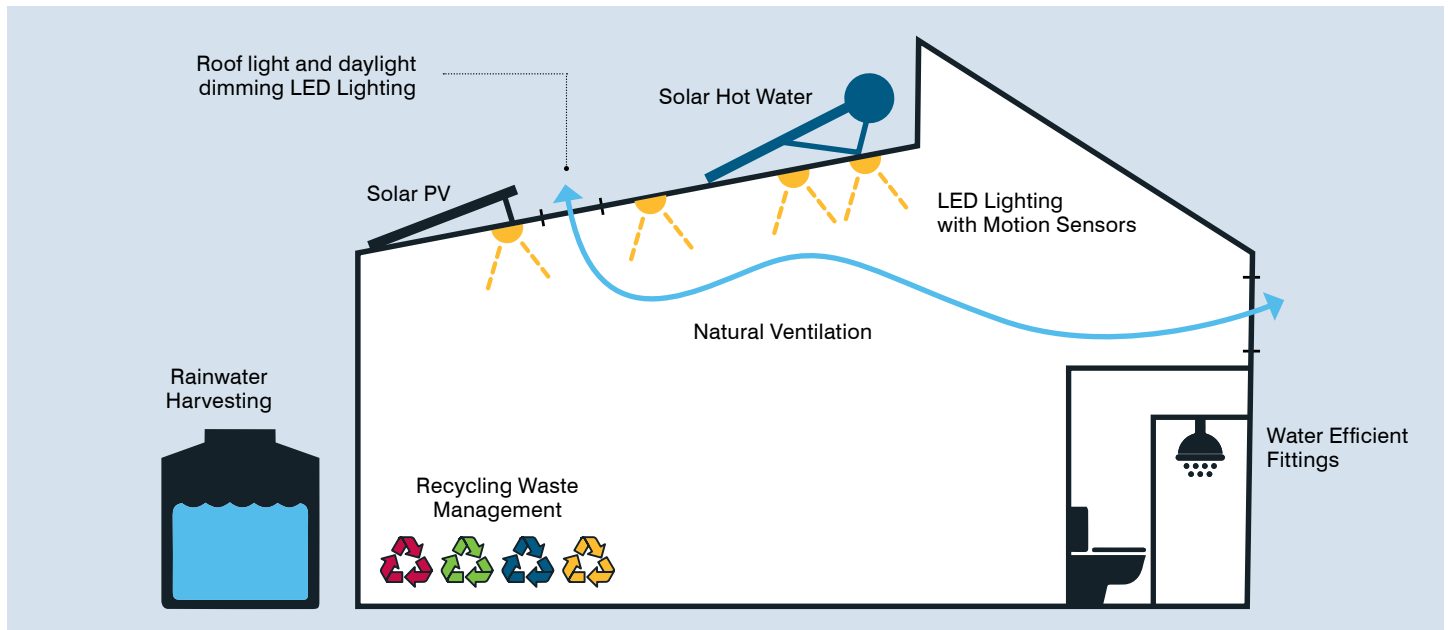


Figure 3.4 Sketch of Depot sustainability strategy

Indoor Environment Quality

Community building assets can be indoor environment quality sensitive assets, depending on the activities occurring on the space and the duration of the events. Efforts to improve indoor environment quality can be addressed in the following ways:

- Selection of low emission materials, including low VOC paints, adhesives, sealants and carpets, engineered wood products with low formaldehyde emissions
- Design for an improved air quality in the space by incorporating natural or mixed mode air conditioning increased levels of outside air, beyond code compliance (AS1668.2.2012), and exhaust of pollutants
- Improved occupant experience through appropriate noise levels and reverberation level in accordance with AS2107.2000, inclusion of awnings, blinds, screens to control glare and floorplate design to allow access to sunlight and views

Depots

Asset examples: Alexandra Canal, Bay Street, Epsom Road, Sydney Park Nursery

Some sustainability frameworks exist for Depots, the Green Building Council of Australia's Green Star Design and As Built rating system is applicable to all building type inclusive of Depots. However, the tool is not well suited to the framework and as such careful consideration and justification is recommended prior to pursuing a Certified Green Star rating on a Depot project. The project team should consider the [City's Benchmarking and Ratings Policy \(TRIM\)](#) prior to pursuing certification.

The following sections outline what are sensitive sustainability aspects for Depots, and should be included within the SDTG tool.

Energy and Emissions

Efforts to reduce energy and emission intensity should be addressed in the following ways:

- Reduce the requirements and demands of energy through the use of passive design strategies including the incorporation orientation optimisation, external shading, north facing windows for daylight penetration, maximise natural or mixed mode ventilation areas for reduced air conditioning
- Maximising rooftop solar PV system for zero carbon energy supply
- High efficiency services including fans, pumps, chillers, hot water generators, cooling towers, lighting systems
- Appropriate SMART metering systems to enable effective energy management in operation

Water

Efforts to reduce water consumption should be addressed in the following ways:

- Reducing the demand for all water through efficient fixtures, efficient appliances, low demand irrigation landscaping
- Supplying non-potable water demands (toilet flushing, urinals, cooling towers and landscaping) through either rainwater capture and storage, connection to utility or private recycled water network scheme particularly if depot has wash-down requirement or other water intensive industrial demands
- Appropriate SMART metering systems to enable effective water management in operation

05 Appendix B: References

The City's Guidelines:

City's Benchmarking and Ratings Policy (TRIM)
<https://record.cityofsydney.nsw.gov.au/2017/203940.ref>

City's Guidelines on Green Travel Plans
<http://www.cityofsydney.nsw.gov.au/development/planning-controls/travel-plans/how-to-develop-implement-and-review-a-travel-plan>

City's Guidelines for Solar Photovoltaic (PV) Panel Installation on City Assets
<https://record.cityofsydney.nsw.gov.au/2017/005321-33.ref>

Sustainability Benchmarking Quick Guide Version of 12 December
<https://record.cityofsydney.nsw.gov.au/2017/050910-01.ref>

Sydney Streets Code 2013
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0008/147860/SydneyStreetsCode2013_Adopted_2400613_Part1.pdf

Sydney Lights Code 2015
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0004/142987/Sydney-Lights-Public-Domain-Design-Code.pdf

Sydney Landscape Code Volume 1 2015
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0008/277847/Landscape-Code-Volume-1-Single-Dwellings_Web.pdf

Sydney Landscape Code Volume 2 2015
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0009/277848/Landscape-Code-Volume-2_Web.pdf

Sydney Streets Technical Specification 2016
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0009/142569/Sydney-Street-Technical-Specification-Version-4.pdf

Green Roofs and Walls Design Advice
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0005/221927/Green-Roofs-DA-and-Design-Advice.pdf

Public Domain Codes
<http://www.cityofsydney.nsw.gov.au/development/planning-controls/development-policies/public-domain-design-codes>

Draft Parks Code
<https://record.cityofsydney.nsw.gov.au/2017/305851.ref>

Draft Internal Habitat Guidelines
<https://record.cityofsydney.nsw.gov.au/2017/185919.ref>

The City's Project Management Tools:

PMO – Framework
<http://citynet.cityofsydney.nsw.gov.au/ourorg/projectmanagement/Pages/default.aspx>

The City's Plans

Environmental Action 2016-2021 Strategy and Action Plan
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0007/284749/Environmental-Action-strategy-and-action-plan.pdf

City's Adapting for Climate Change Strategy
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0013/250123/2016-022571-Adapting-to-Climate-Change_accessible.pdf

City of Sydney WSUD & Stormwater Infrastructure Report
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0015/151206/WSUD-and-Stormwater-Report.pdf

City's Decentralised Water Master Plan 2012 – 2030
http://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0005/122873/Final-Decentralised-Water-Master-Plan.pdf

City's Waste Strategy

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0019/122914/InterimWasteStrategy.pdf

City of Sydney Policy for Waste Minimisation in New Developments

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0018/120384/WasteCodeForNewDevelopments.pdf

City's Waste Approvals Policy

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0007/194380/waste_policy_local_approvals_policy_for_managing_waste_in_public_places_21_october_2013.pdf

Urban Forest Strategy

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0003/132249/Urban-Forest-Strategy-Adopted-Feb-2013.pdf

Tree Management Policy

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0020/132248/Tree-Management-Policy.pdf

Street Tree Masterplan

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0015/130236/STMP2011_150501-PartA.PDF

Urban ecology plan

http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0011/198821/2014-109885-Plan-Urban-Ecology-Strategic-Action-Plan_FINAL-adopted.pdf or <https://record.cityofsydney.nsw.gov.au/2014/109885.ref>

City's Benchmarking and Ratings Policy

<https://record.cityofsydney.nsw.gov.au/2017/203940.ref>

Other Resources

Australian Guidelines for Water Recycling - Augmentation of Drinking Water Supplies, May, 2008:

<http://agriculture.gov.au/SiteCollectionDocuments/water/water-recycling-guidelines-augmentation-drinking-22.pdf>

Managing urban stormwater (MUS): soils and construction vol. 1, A Resource Guide for Local Councils – Erosion and Sediment Control, DEC

<http://www.environment.nsw.gov.au/resources/water/BlueBookVol1.pdf>

Australian Steel Institute: <http://steel.org.au/>

FSC website: <https://au.fsc.org/en-au>

FEFC website: <http://www.pefc.org/>

Green Building Council Australia (GBCA):

<http://new.gbca.org.au/>

Green Star Design and As Built Submission Guidelines v1.1

<https://record.cityofsydney.nsw.gov.au/2017/295603.ref>

Infrastructure Sustainability Council of Australia (ISCA)

<https://isca.org.au/>

NABERS <https://www.nabers.gov.au>

Walkscore <https://www.walkscore.com/>

Window Energy Rating Scheme <https://www.wers.net>

06 Glossary

Alternative water source: Water from either a recycled water system or network, rain water collection or bore water

Biodiversity: Refers to the variety of species of flora and fauna in the habitat in question

Building Monitoring and Controls System (BMCS): The system used to monitor, log, alarm and control all systems within a building

Business Case: Stage within the City's project management framework, which also the second stage requiring actions within the SDTG tool

Climate adaptation / climate resilience: Taking actions to manage risks from climate impacts, including economic, social and environmental risks

Cogeneration: On site energy production (typically gas engine or microturbine) producing heating and electricity

Contract Brief: A list of sustainability contract clauses which are to be achieved by the contract parties. The contract brief is generated based on the Sustainability Requirements selected within the SDTG tool

COP: Coefficient of performance, a measure of the efficiency of heating systems

Cross-Ventilation: Design of the inlets and outlets of air through a space to allow natural breezes to pass through the occupied spaces

Economy cycle: When conditions are suitable the mechanical system is enabled to take additional outside air in order to reduce cooling requirements

EER: Energy efficiency ratio, a measure of the efficiency of cooling systems

Embedded emissions: Greenhouse gas emissions associated with the sourcing and production of materials prior to arrival at the project site

GEMS: Greenhouse and Energy Minimum Standards; Federal Legislation framework regarding the minimum energy efficiency and greenhouse emission levels for products being sold in Australia

GHG Emissions intensity: Greenhouse gas emission intensity is the amount of greenhouse gas emissions (CO₂-e) that is attributed to a project per unit of area per annum (usually either Gross Floor Area or Net Lettable Area) in operation

Green Star: A holistic sustainability rating tool administered by the Green Building Council of Australia, rating buildings, interiors and precinct projects from planning through to operations

Heat recovery: Use of a heat exchanger to recover energy leaving the system through relief air or exhaust systems

Initiation Brief: Stage within the City's project management framework, which also the first stage requiring actions within the SDTG tool

JV3: Energy Efficiency Verification Methodology provided in the NCC 2016

Lighting power density: Maximum lighting power energy consumption per square meter across a project (W/m²)

MEPS: Minimum Energy Performance Standards; specific energy performance standards for products under the GEMS scheme

Milestone Tracking: Regular stages within the delivery stage, can be linked to contractor payments. Also a page in the STDG tool used to check, review and monitor the status for the project against the contract brief requirements

Mixed mode ventilation: A building or room designed to operate in either natural ventilation mode or mechanical air conditioning mode

MUSIC Stormwater Modelling: Model for Urban Stormwater Improvement Conceptualisation; modelling software used to predict the performance of stormwater quality management systems

NABERS: National Australian Built Environment Rating System, a framework to rate the sustainability performance of buildings in operation

Natural ventilation: A passive design, aimed to create comfortable conditions within a building without the need for mechanical air conditioning systems

NCC 2016: National Construction Code 2016

NCC Section J Glazing Calculator: A tool provided by the BCA which determines the minimum glazing requirements for a given building design

Net-zero building: A building which has a net greenhouse gas emission intensity of zero in operation. This can be achieved through exporting zero carbon energy, to offset high carbon energy supply from the grid electricity network

On-site solar PV: A solar photovoltaic system located within the site boundary, offsetting the projects energy consumption off the grid electricity network (ie, connected on the project site's side of the utility meter)

Passive design: Passive design refers to the use of the sun's energy for the heating, cooling and lighting of spaces. The project or individual element of it take advantage of characteristics in materials, design and air movements created by exposure to the sun

Photo-electric sensor: A sensor to detect motion within a nearby vicinity

Project Aspects: Page in the STDG tool which allows for a selection of Sustainability Aspects relevant to the project being assessed

Project Completion: Stage within the City's project management framework, which also the final stage requiring actions within the SDTG tool

Project Plan: Stage within the City's project management framework, which also the third stage requiring actions within the SDTG tool

Sustainability Advisor: Internal sustainability specialist, usually from the Green Infrastructure team, who has been consulted for the project

Thermal inertia: The speed at which thermal mass will approach the temperature of its surroundings, i.e. Concrete has a large thermal inertia, plasterboard has a small thermal inertia

Thermal labyrinth: A thermal mass, exposed surface area air intake to cool air prior to entering a building

Trigeneration: A cogeneration system paired with an absorption chiller for the production of chilled water for cooling

Urban heat island effect: An urban area which is warmer than surrounding rural areas, due to thermal mass and surface modifications that come with urban areas

Walkscore: An online calculator, scoring a locations proximity to amenities

Water intensity: Water intensity is the amount of potable water that is attributed to a project per unit of area per annum (usually either Gross Floor Area or Net Lettable Area) in operation

Water Sensitive Urban Design: An urban design integrating the urban water cycle, stormwater, groundwater and wastewater management for improved environmental performance

WELS: Water Efficiency Labelling and Standards; a federally mandated rating scheme for determining the water efficiency of certain products

WERS: Window Energy Rating Scheme

Xeriscaping principles: Use of landscaping that requires little or no irrigation or maintenance





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